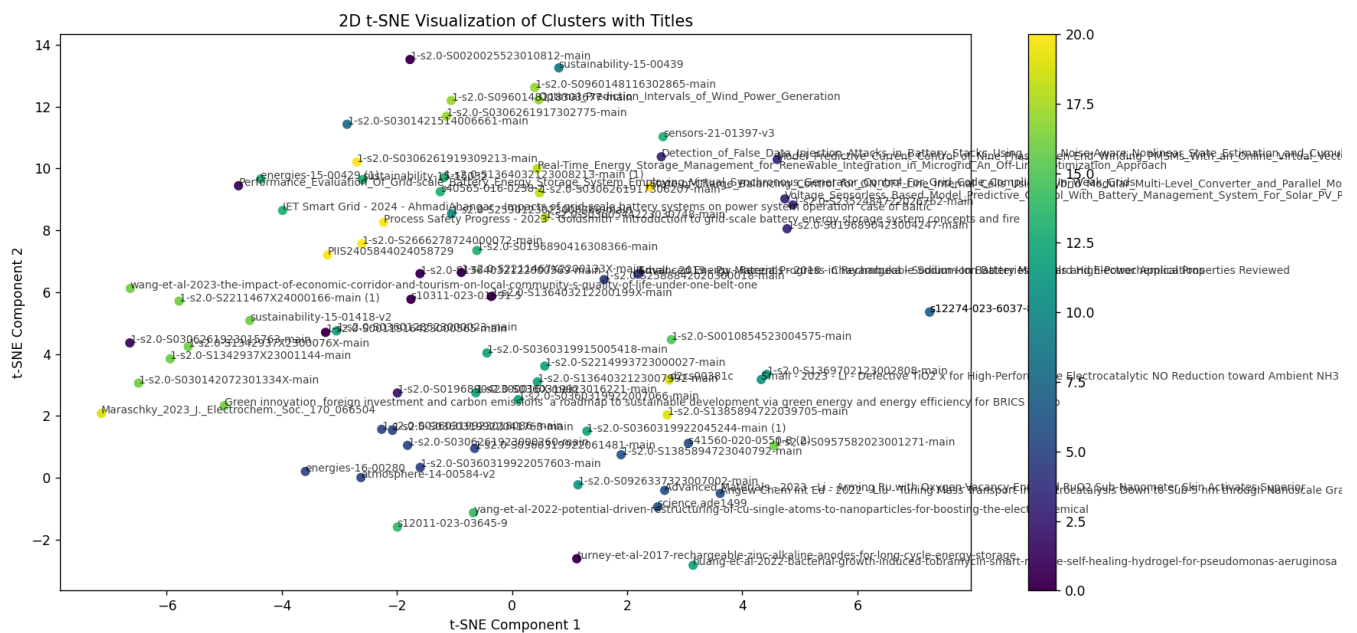
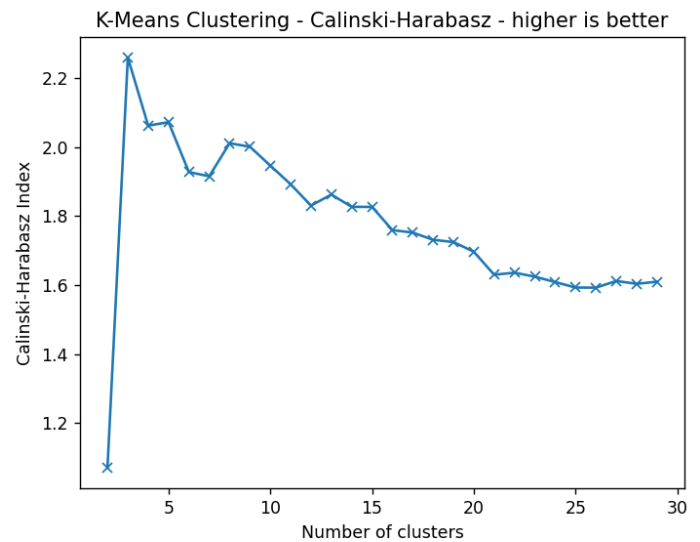
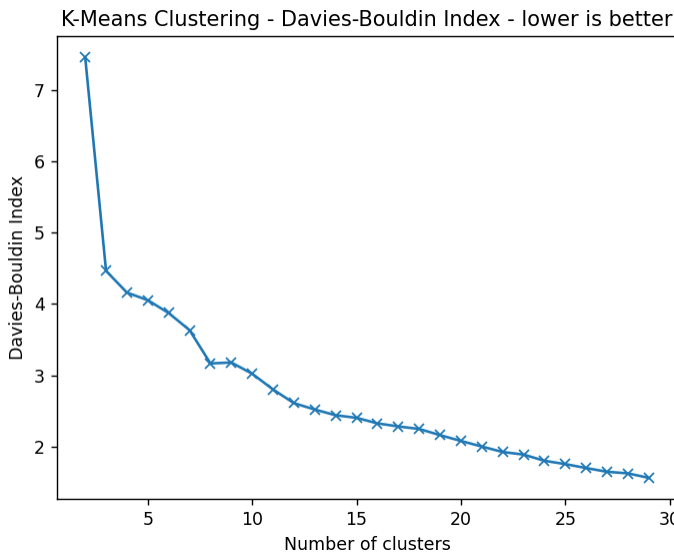
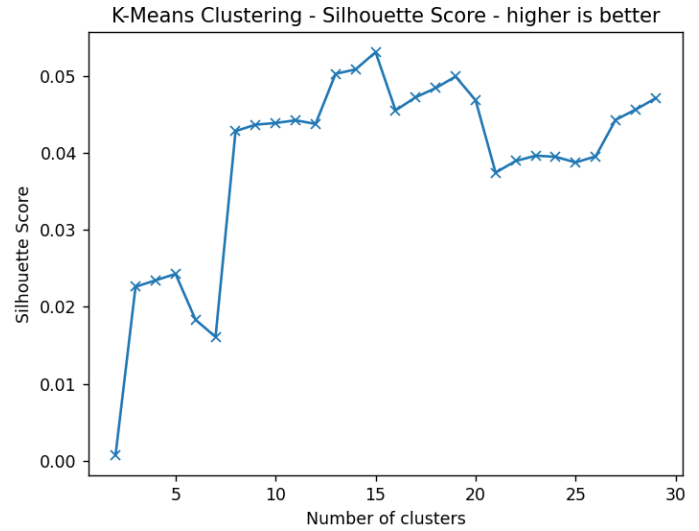
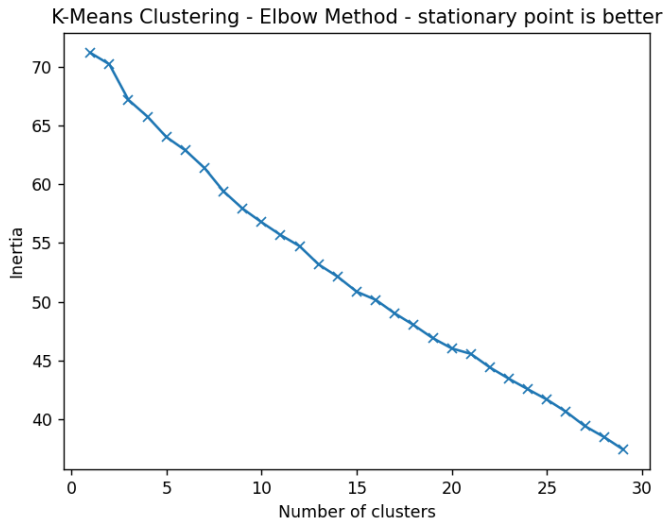
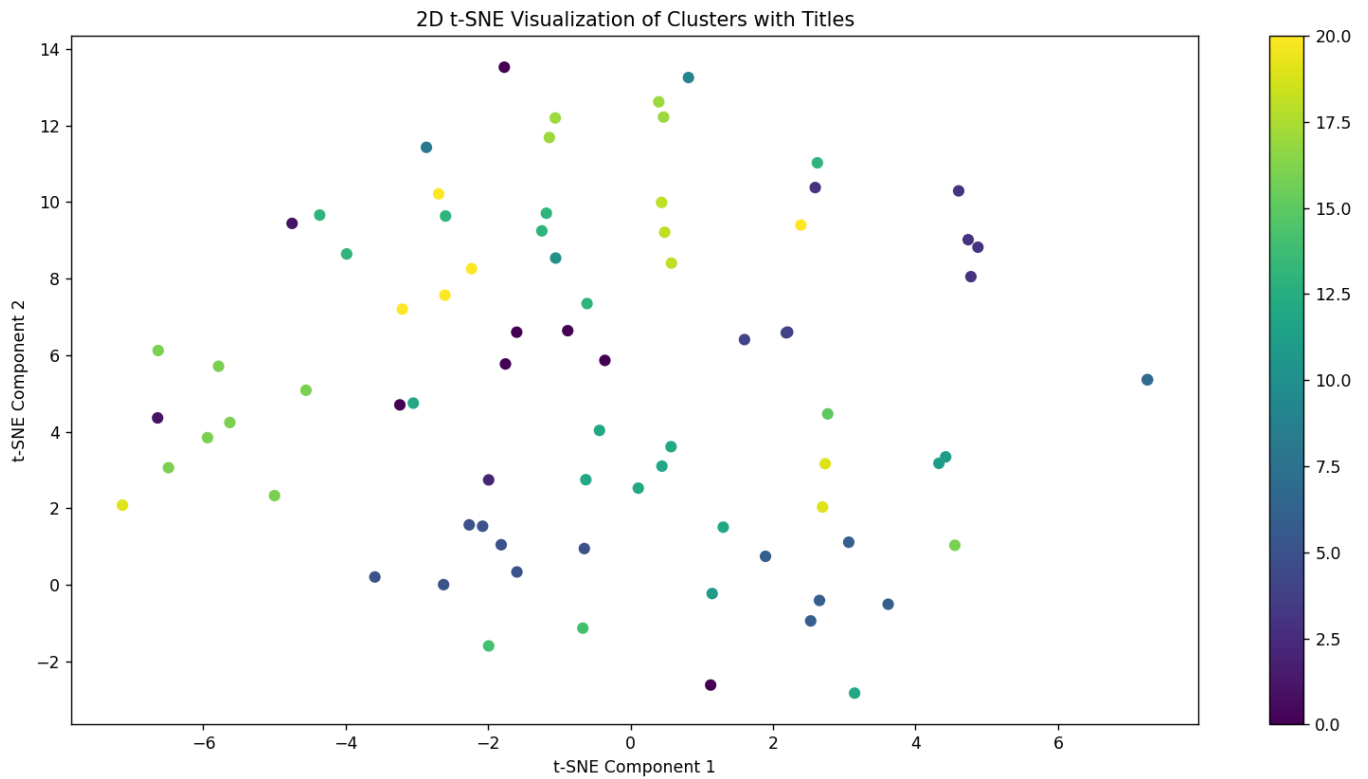


K-Means Clustering, optimal cluster and solution evaluation:





The first 2 graphs use the elbow method and silhouette score to approximate the optimal number of clusters as being 21. Next using the plots of Davies-Bouldin and Calinski-Harabasz indexes the chosen number of clusters is evaluated and found to be of sufficient quality.

Paper-Cluster analysis:

Paper: "1-s2.0-S0010854523004575-main" belongs to cluster 16
 Paper: "1-s2.0-S0011916423000565-main" belongs to cluster 1
 Paper: "1-s2.0-S0020025523010812-main" belongs to cluster 1
 Paper: "1-s2.0-S0196890416308366-main" belongs to cluster 14
 Paper: "1-s2.0-S019689042300016X-main" belongs to cluster 3
 Paper: "1-s2.0-S0196890423004247-main" belongs to cluster 4
 Paper: "1-s2.0-S030142072301334X-main" belongs to cluster 17
 Paper: "1-s2.0-S0301421514006661-main" belongs to cluster 9
 Paper: "1-s2.0-S0306261917302775-main" belongs to cluster 18
 Paper: "1-s2.0-S0306261917306207-main" belongs to cluster 19
 Paper: "1-s2.0-S0306261919309213-main" belongs to cluster 21
 Paper: "1-s2.0-S0306261923000260-main" belongs to cluster 6
 Paper: "1-s2.0-S0306261923015763-main" belongs to cluster 2
 Paper: "1-s2.0-S0360128523000023-main" belongs to cluster 13
 Paper: "1-s2.0-S0360319915005418-main" belongs to cluster 13
 Paper: "1-s2.0-S0360319922007066-main" belongs to cluster 13
 Paper: "1-s2.0-S0360319922041763-main" belongs to cluster 6
 Paper: "1-s2.0-S0360319922045244-main (1)" belongs to cluster 13
 Paper: "1-s2.0-S0360319922057603-main" belongs to cluster 6
 Paper: "1-s2.0-S0360319922061481-main" belongs to cluster 6
 Paper: "1-s2.0-S0360319923016221-main" belongs to cluster 13
 Paper: "1-s2.0-S0360319923018086-main" belongs to cluster 6
 Paper: "1-s2.0-S0360544223030748-main" belongs to cluster 19
 Paper: "1-s2.0-S0926337323007002-main" belongs to cluster 12
 Paper: "1-s2.0-S0957582023001271-main" belongs to cluster 17

Paper: "1-s2.0-S0960148116302865-main" belongs to cluster 18

Paper: "1-s2.0-S0960148118303677-main" belongs to cluster 18

Paper: "1-s2.0-S1342937X2300076X-main" belongs to cluster 17

Paper: "1-s2.0-S1342937X23001144-main" belongs to cluster 17

Paper: "1-s2.0-S1364032122000569-main" belongs to cluster 1

Paper: "1-s2.0-S136403212200199X-main" belongs to cluster 1

Paper: "1-s2.0-S1364032123007992-main" belongs to cluster 13

Paper: "1-s2.0-S1364032123008213-main (1)" belongs to cluster 14

Paper: "1-s2.0-S1369702123002808-main" belongs to cluster 12

Paper: "1-s2.0-S1385894722039705-main" belongs to cluster 20

Paper: "1-s2.0-S1385894723040792-main" belongs to cluster 7

Paper: "1-s2.0-S2211467X2200133X-main" belongs to cluster 1

Paper: "1-s2.0-S2211467X24000166-main (1)" belongs to cluster 17

Paper: "1-s2.0-S2214993723000027-main" belongs to cluster 13

Paper: "1-s2.0-S2352484722026762-main" belongs to cluster 4

Paper: "1-s2.0-S2588842020300018-main" belongs to cluster 5

Paper: "1-s2.0-S2590123023008368-main" belongs to cluster 11

Paper: "1-s2.0-S2666278724000072-main" belongs to cluster 21

Paper: "Advanced Energy Materials - 2018 - Chayambuka - Sodium-Ion Battery Materials and Electrochemical Properties Reviewed" belongs to cluster 5

Paper: "Advanced Materials - 2023 - Li - Arming Ru with Oxygen-Vacancy-Enriched RuO₂ Sub-Nanometer Skin Activates Superior" belongs to cluster 7

Paper: "Angew Chem Int Ed - 2022 - Liu - Tuning Mass Transport in Electrocatalysis Down to Sub-5 nm through Nanoscale Grade" belongs to cluster 7

Paper: "atmosphere-14-00584-v2" belongs to cluster 6

Paper: "d2cs00381c" belongs to cluster 20

Paper: "Detection_of_False_Data_Injection_Attacks_in_Battery_Stacks_Using_Input_Noise-Aware_Nonlinear_State_Estimation_and_Cumulative_Sum_Algorithms" belongs to cluster 4

Paper: "energies-15-00429 (1)" belongs to cluster 14

Paper: "energies-16-00280" belongs to cluster 6

Paper: "Green innovation foreign investment and carbon emissions a roadmap to sustainable development via green energy and energy efficiency for BRICS econo" belongs to cluster 17

Paper: "huang-et-al-2022-bacterial-growth-induced-tobramycin-smart-release-self-healing-hydrogel-for-pseudomonas-aeruginosa" belongs to cluster 13

Paper: "IET Smart Grid - 2024 - AhmadiAhangar - Impacts of grid-scale battery systems on power system operation case of Baltic" belongs to cluster 14

Paper: "Maraschky_2023_J._Electrochem._Soc._170_066504" belongs to cluster 20

Paper: "Model_Predictive_Current_Control_of_Nine-Phase_Open-End_Winding_PMSMs_With_an_Online_Virtual_Vector_Synthesis_Strategy" belongs to cluster 4

Paper: "Optimal_Prediction_Intervals_of_Wind_Power_Generation" belongs to cluster 18

Paper: "Performance_Evaluation_Of_Grid-scale_Battery_Energy_Storage_System_Employing_Virtual_Synchronous_Generator_Control_For_Grid_Code_Compliance_In_Weak_Grids" belongs to cluster 2

Paper: "PIIS2405844024058729" belongs to cluster 21

Paper: "Process Safety Progress - 2023 - Goldsmith - Introduction to grid-scale battery energy storage system concepts and fire" belongs to cluster 21

Paper: "Real-Time_Energy_Storage_Management_for_Renewable_Integration_in_Microgrid_An_Off-Line_Optimization_Approach" belongs to cluster 19

Paper: "s10311-023-01591-5" belongs to cluster 1

Paper: "s12011-023-03645-9" belongs to cluster 15

Paper: "s12274-023-6037-8(1)" belongs to cluster 8

Paper: "s12274-023-6037-8" belongs to cluster 8

Paper: "s40565-016-0238-z" belongs to cluster 14

Paper: "s41560-020-0550-8 (2)" belongs to cluster 7

Paper: "science.ade1499" belongs to cluster 7

Paper: "sensors-21-01397-v3" belongs to cluster 14

Paper: "Small - 2019 - Pu - Recent Progress in Rechargeable Sodium-Ion Batteries toward High-Power Applications" belongs to cluster 5

Paper: "Small - 2023 - Li - Defective TiO₂ x for High-Performance Electrocatalytic NO Reduction toward Ambient NH₃ Production" belongs to cluster 12

Paper: "State-of-Charge_Balancing_Control_for_ON-OFF-Line_Internal_Cells_Using_Hybrid_Modular_Multi-Level_Converter_and_Parallel_Modular_Dual_L-Bridge_in_a_Grid-Scale_Battery_Energy_Storage_System" belongs to cluster 21

Paper: "sustainability-15-00439" belongs to cluster 10

Paper: "sustainability-15-01418-v2" belongs to cluster 17

Paper: "sustainability-15-15032" belongs to cluster 14

Paper: "turney-et-al-2017-rechargeable-zinc-alkaline-anodes-for-long-cycle-energy-storage" belongs to cluster 1

Paper: "Voltage_Sensorless_Based_Model_Predictive_Control_With_Battery_Management_System_For_Solar_PV_Powered_On-Board_EV_Charging" belongs to cluster 4

Paper: "wang-et-al-2023-the-impact-of-economic-corridor-and-tourism-on-local-community-s-quality-of-life-under-one-belt-one" belongs to cluster 17

Paper: "yang-et-al-2022-potential-driven-restructuring-of-cu-single-atoms-to-nanoparticles-for-boosting-the-electrochemical" belongs to cluster 15

Optimal Clusters:

Number of clusters identified as optimal: 21

Cluster Size:

Some clusters have 1 paper which requires further inspection, may be due to papers being unique or overfitting of dataset.

Cluster 16 had 1 paper/s.

Cluster 1 had 7 paper/s.

Cluster 14 had 7 paper/s.

Cluster 3 had 1 paper/s.

Cluster 4 had 5 paper/s.

Cluster 17 had 8 paper/s.

Cluster 9 had 1 paper/s.

Cluster 18 had 4 paper/s.

Cluster 19 had 3 paper/s.

Cluster 21 had 5 paper/s.

Cluster 6 had 7 paper/s.

Cluster 2 had 2 paper/s.

Cluster 13 had 8 paper/s.

Cluster 12 had 3 paper/s.

Cluster 20 had 3 paper/s.

Cluster 7 had 5 paper/s.

Cluster 5 had 3 paper/s.

Cluster 11 had 1 paper/s.

Cluster 15 had 2 paper/s.

Cluster 8 had 2 paper/s.

Cluster 10 had 1 paper/s.

Cluster Key Terms/topics (if time permitted would have used token frequency to determine key terms/topics, realised this last moment):

Cluster: 16, with 1 paper/s had the following terms/topics (wavelength, energy, photostatic):

{'septemb', 'huaxin', 'fluoresc', 'potenti', 'howev', 'wavelength', 'effortless', 'energi', 'dehydr', 'photost', 'diversifi', 'zhang', 'accord', 'yi', '"bottomup"', 'function', 'develop', 'arc', 'coat', 'appli', 'small', 'result', 'basic', 'volv', 'ji', 'sourc', 'amorph', 'author', 'offer', 'f', 'cytotox', 'correspond', 'diod', 'emiss', 'four', 'year', 'group', 'vivo', 'refer', 'sinc', 'fundament', 'list', 'surfac', 'achiev', 'scientist', 'synthet', 'research', 'state', 'introduc', 'numer', 'univers', 'accident', 'seek', 'journal', '"topdown"', 'physi', 'cpd', 'polychromat', 'subsequ', 'process', 'juli', 'divid', 'graphen', 'signific', 'mention', 'dot', 'homepag', 'convers', 'discharg', 'inert', 'zou', 'email', 'face', 'domain', 'synthes', 'graphit', 'materi', 'purifi', 'address', 'e', 'made', 'along', 'right', 'imag', 'calli', 'key', 'dispers', 'outstand', 'tie', 'extens', 'deng', 'exhibit', 'usual', 'roughli', 'fine', 'china', 'sun', 'constitu', 'amino', 'zhong', 'variou', 'challeng', 'south', 'util', 'discoveri', 'xue', 'n', 'h', 'aromat', 'element', 'b', 'characterist', 'cdstabl', 'famili', 'area', 'liu', 'studi', 'reserv', 'hongshuai', 'changsha', 'cell', 'gain', 'spheric', 'p', 'c', 'due', 'carboxyl', 'layer', 'either', 'proper', 'deliveri', 'biocompat', 'led', 'et', 'singlewal', 'wwwelseviercomlocateccr', 'use', 'photocatalysi', 'light', 'review', 'new', 'larger', 'promis', 'synthesi', 'httpsdoiorgjccr', 'remark', 'like', 'discuss', 'composit', 'ring', 'addit', 'modif', 'less', 'hydroxyl', 'uniqu', 'quantum', 'manufac', 'nm', 'regard', 'polym', 'accept', 'r', 'illustr', 'classifi', 'chemistri', 'drug', 'size', 'neglig', 'strip', 'avail', 'particular', 'cd', 'articl', 'nanomateri', 'limit', '@', 'qing', 'name', 'applic', 'found', 'method', 'crystal', 'creat', 'wentao', 'metallurgi', 'storag', 'differ', '"top', 'sciencedirect', 'provid', 'worth', 'l', 'aim', 'powder', 'member', 'engin', 'advanc', 'nanotub', 'tradit', 'cnd', 'keyword', 'novel', 'highli', 'content', 'rout', 'still', 'pan', 'nanodot', 'summar', 'receiv', 'describ', 'particl', 'possess', 'properti', 'product', 'except', 'given', 'hshoucsueducn', 'recent', 'crosslink', 'ture', 'frame', 'discov', 'adjust', 'belong', 'carbon', 'thorough', 'onlin', 'base', 'apart', 'includ', 'introduc', 'xiaobo', 'guoqiang', 'in', 'categori', '-', 'type', 'emerg', 'select', 'final', 'appropri', 'bv', 'down"', 'cqcd', 'fig', 'summari', 'elsevi', 'among', 'emit', 'hou', 'laboratori', 'semiconductor', 'attent', 'al', 'octob', 'slightli', 'strategi', 'chemic', 'sens', 'coordin', 'control', 'focu', 'gener', 'colleg', 'first', 'high', 'techniqu', 'central', 'dope', 'way', 'overview', 'gqd', 'etc', 'core', 'yield', 'mani'}

Cluster: 1, with 7 paper/s had the following terms/topics (desalin, ocean, Australian, deep, green, biomass, deforest):

{'explor', 'could', 'decemb', 'energi', 'baselin', 'zhang', 'smooth', 'pei', 'altern', 'solv', 'opposit', 'dioxid', 'result', 'cut', 'expos', 'intellig', 'investig', 'wwwelseviercomlocaters', 'f', 'improv', 'omareeeeaustedu', 'offer', 'survey', 'synergi', 'gridscale', 'design', 'sinc', 'cannot', 'germani', 'particularli', 'list', 'dataset', 'though', 'workplac', 'countri', 'manual', 'fewest', 'back', 'plausibl', 'fuelsbas', 'introduc', 'detail', 'reflect', 'manufactur', 'statist', 'turn', 'directli', 'imperli', 'without', 'process', 'across', 'differ', 'becom', 'origin', 'almost', 'nation', 'rooney', 'convers', 'gasfir', 'salemmusmmi', 'pv', 'approach', 'accel', 'physic', 'classif', 'earth', 'endus', 'januari', 'occur', 'graduat', 'pvtdecal', 'materi', 'friendli', 'australian', 'efficaci', 'lastli', 'pr', 'decad', 'right', 'wei', 'home', 'ware', 'give', 'also', 'microstructur', 'convent', 'tidal', 'keep', 'usag', 'green', 'variou', 'greenhous', 'ang', 'sunni', 'util', 'strength', 'weihekclacuk', 'nox', 'life', 'threat', 'rafal', 'mm', 'erat', 'mohamad', 'weight', 'adequ', 'enhanc', 'king', 'excess', 'david', 'either', 'construct', 'moditi', 'xray', 'fuel', 'requir', 'use', 'set', 'known', 'mejbaul', 'overall', 'exploit', 'letter', 'may', 'costperkilomet', 'energyeffici', 'bangladesh', 'suggest', 'industry', 'stove', 'merit', 'arbitrag', 'turbine', 'specific', 'lead', 'sector', 'well', 'eutroph', 'societ', 'purif', 'nevertheless', 'r', 'network', 'illustr', 'option', 'opinion', 'us', 'cloud', 'handl', 'usm', 'paradigm', 'catalyz', 'farrok', 'fault', 'effici', 'applic', 'found', 'decis', 'storag', 'cmarkidesimperialacuk', 'sciencedirect', 'last', 'ex', 'swot', 'photovolta', 'lowest', 'inc', 'oh-and', 'keyword', 'still', 'carri', 'electron', 'infrastructur', 'properti', 'integr', 'tabul', 'intervent', 'varieti', 'ozon', 'hybrid', 'adjust', 'reveal', 'httpcreativecommonsorglicensesbi', 'devic', 'strateg', 'captur', 'rigor', 'neg', 'complex', 'modern', 'format', 'desalin', 'synergist', 'himadri', 'climat', 'pow-seng', 'sustain', '-', 'conclud', 'prabaharan', 'learningguid', 'pedest', 'madonski', 'safeti', 'world', 'select', 'learn', 'seen', 'bv', 'revis', 'operando', 'elsevi', 'save', 'measur', 'huang', 'per', 'attent', 'around', 'price', 'strategi', 'appar', 'reduct', 'command', 'control', 'must', 'report', 'august', 'central', 'awar', 'remot', 'etc', 'autonom', 'soft', 'core', 'topic', 'abidrgmailcom', 'restructur', 'profoundli', 'heat', 'electr', 'offgrid', 'mani', 'farreach', 'readili', 'access', 'bear', 'co', 'map', 'haqu', 'ikko', 'lin', 'ena', 'incom', 'pandem', 'electrod', 'function', 'reliabl', 'stdesalin', 'two', 'import', 'anod', 'inde', 'renew', 'situ', 'forecast', 'licens', 'year', 'today', 'stateofheart', 'goal', 'show', 'view', 'via', 'achiev', 'powsengyapxjtlueducn', 'longcycl', 'work', 'passiv', 'research', 'nibong', 'state', 'continu', 'mohammad', 'univers', 'photovoltaictherm', 'cost', 'seek', 'analys', 'juli', 'overload', 'signific', 'mental', 'publish', 'releas',

'realtim', 'homepag', '.', 'concern', 're', 'supervis', 'analysi', 'moham', 'russia', 'nois', 'case', 'term', 'economi', 'lockin', 'warm', 'amount', 'transform', 'e', 'along', 'inhabit', 'deploy', 'zero', 'experiment', 'usual', 'boiler', 'power', 'china', 'adopt', 'trade', 'mujeeb', 'ocean', 'capac', 'discoveri', 'suffoc', 'compress', 'mwh', 'met', 'h', 'highlight', 'nanoscal', 'ml', 'b', 'characterist', 'depend', 'bioenergi', 'disclaim', 'area', 'p', 'authorship', 'gration', 'c', 'due', 'ahmad', 'perturb', 'affect', 'deep', 'day', 'dhaka', 'et', 'zhongyi', 'train', 'rockhampton', 'market', 'cover', 'major', 'air', 'novemb', 'clean', 'represent', 'xie', 'attribut', 'scale', 'page', 'shelf', 'struggl', 'environ', 'optim', 'costeffect', 'wwwelseviercomlocatedes', 'increas', 'addit', 'india', 'formul', 'tsinghua', 'coal', 'salem', 'accept', 'unannot', 'big', 'fuelbas', 'accuraci', 'need', 'reaction', 'diagnos', 'atmospher', 'comprehens', 'avail', 'therebi', 'decarbon', 'minim', 'deplet', 'whole', 'time', 'inform', 'analyz', 'limit', '©', 'warmer', 'flood', 'ahsanullah', 'arriv', 'temperatur', 'london', 'harm', 'offici', 'diagnosi', 'test', 'te', 'interest', 'engin', 'aim', 'ab', 'switch', 'content', 'one', 'novel', 'water', 'receiv', 'probabilist', 'intens', 'remain', 'httpsdoiorg', 'product', 'solut', 'definit', 'op\xad', 'help', 'rahman', 'current', 'note', 'analyt', 'panel', 'abidur', 'propos', 'radiat', 'carbon', 'idea', 'sell', 'zinc', 'preliminari', 'base', 'uncontrol', 'issu', 'includ', 'manag', 'md', '~', 'microscopi', 'extern', 'ga', 'yap', 'spectrum', 'make', 'possibl', 'urgent', 'european', 'besid', 'sciarretta', 'march', 'henc', 'emerg', 'chen', 'batteryrel', 'chnlinchengmailcom', 'crisi', 'agenc', 'futur', 'level', 'commun', 'emit', 'laboratori', 'rise', 'octob', 'oil', 'necessarili', 'consumpt', 'mainten', 'resourc', 'focu', 'polici', 'scienc', 'colleg', 'gener', 'ltd', 'fight', 'gradual', 'oper', 'techniqu', 'better', 'ident', 'river', 'coupl', 'model', 'han', 'grow', 'thanjavur', 'afford', 'impact', 'canberra', 'order', 'billion', 'far', 'constant', 'alway', 'million', 'section', 'decisionmak', 'usa', 'aosmanahmedqubacuk', 'sourc', 'exampl', 'cycl', 'windi', 'abil', 'centuri', 'correspond', 'hinder', 'tanveerahmajnueducn', 'omar', 'asad', 'form', 'experi', 'strict', 'weak', 'tzezhang', 'caus', 'tehran', 'stand', 'journal', 'therefor', 'throughput', 'past', 'fossil', 'vahidi', 'never', 'xwztsinghuaorgcn', 'vol', 'start', 'tanveerahmadpkgmailcom', 'health', 'wide', 'bc', 'plan', 'technolog', 'main', 'highest', 'equal', 'ress', 'discrimin', 'role', 'demand', 'kalt', 'effort', 'ie', 'offset', 'wind', 'purpos', 'guangxi', 'gase', 'densiti', 'societi', 'featur', 'zn', 'extends', 'replac', 'earli', 'exist', 'essenti', 'abideeeaaustedu', 'lie', 'cybersecur', 'alhuyi', 'sun', 'pvtdesalin', 'signific', 'object', 'datadriven', 'immedi', 'inte\xad', 'cleaner', 'invest', 'funda\xad', 'kamarol', 'briefli', 'farghali', 'worldwid', 'wwwelseviercomlocatees', 'n', 'effect', 'weather', 'element', 'commiss', 'tanveer', 'sastra', 'grid', 'extend', 'wenzhen', 'heart', 'ihara', 'mdmejbaulhaqueanueduau', 'nexu', 'deficit', 'play', 'superior', 'toxif', 'dri', 'system', 'condit', 'connect', 'crucial', 'vast', 'volum', 'tuscaloosa', 'de', 'econom', 'discuss', 'annot', 'wave', 'ukrain', 'implic', 'mechan', '■', 'progress', '–', 'data', 'practic', 'special', 'autom', 'opportun', 'determin', 'map', 'markid', 'thermal', 'osmot', 'balanc', 'promoteintroduc', 'demonstr', 'follow', 'cd', 'mah', 'consid', 'neural', 'ongo', 'abstract', 'contribut', 'com', 'uk', 'differ', 'conflict', 'l', 'viabl', 'tradit', 'mobil', 'beij', 'rout', 'structur', 'aspect', 'solar', 'especi', 'accur', 'residenti', 'separ', 'combin', 'primari', 'deforest', 'st', 'ignor', 'metric', 'znoh', 'character', 'organ', 'onlin', 'iran', 'coronaviru', 'decreas', 'although', 'sever', 'act', 'human', 'energywat', 'distribut', 'independ', 'exponenti', 'paper', 'x©', 'legisl', 'liquefi', 'shekhar', 'cous', 'urgenc', 'trend', 'among', 'sampl', 'al', 'tremend', 'malaysia', 'depart', 'chemic', 'high', 'chao', 'repeat', 'bling', 'natur', 'adversari', 'offer', 'new', 'httpsdoiorgjin', 'revolut', 'russian', 'center', 'australia', 'nil', 'build', 'potenti', 'care', 'provinc', 'wwwelseviercomlocatein', 'howev', 'indic', 'conjunct', 'pvdesalin', 'allevi', 'w', 'httpsdoiorgjrser', 'solardes', 'other', 'develop', 'evolut', 'nazari', 'author', 'suffici', 'februari', 'monitor', 'methodolog', 'benefit', 'emiss', 'reduc', 'seupb', 'loss', 'tebal', 'speed', 'mhaquecqueduau', 'underli', 'nan', 'approx\xad', 'daytim', 'overcom', 'ping', 'httpsdoiorgjdes', 'subsequ', 'medium', 'perform', 'under\xad', 'initi', 'intern', 'compens', 'harsh', 'flow', 'chang', 'effect', 'geotherm', 'duplic', 'email', 'food', 'eu', 'yet', 'membran', 'natarajan', 'valu', 'electrochem', 'even', 'address', 'made', 'hydro', 'expan', 'programm', 'queensland', 'key', 'approxim', 'cn', 'manner', 'environment', 'ahm', 'transmiss', 'energysav', 'pump', 'target', 'israa', 'expens', 'growth', 'equip', 'nowaday', 'global', 'farm', 'challeng', 'emphasi', 'school', 'compar', 'da', 'necessari', '•', 'respect', 'instanc', 'batteri', 'reserv', 'context', 'studi', 'often', 'get', 'popul', 'scarciti', 'c*', 'plant', 'kwh', 'layer', 'diseas', 'demandsid', 'deliveri', 'concentr', 'latest', 'light', 'genera\xad', 'hydrogen', 'review', 'common', 'focus', 'institut', 'intermitt', 'preliminarili', 'pollut', 'iea', 'lifetim', 'tion', 'zhonghao', 'ii', 'guangdong', 'perspect', 'less', 'christo', 'allow', 'german', 'uniqu', 'stage', 'zhuhai', 'reason', 'chemistri', 'qld', 'damag', 'sain', 'omarruetgmailcom', 'free', 'prevent', 'produc', 'prepar', 'outsid', 'bodi', 'articl', 'edg', 'softwar', 'electrodeposit', 'manifold', 'g', 'pvt', 'share', 'deem', 'literatur', 'jinan', 'vehicl', 'statu', 'identifi', 'provid', 'karlsruh', 'assess', 'useddevelop', 'accid', 'advanc', 'hous', 'rate', 'detriment', 'rest', 'conduct', 'mate', 'sion', 'recent', 'shund', 'industri', 'penang', 'transport', 'dissip', 'ah', 'output', 'express', 'cc', 'advers', 'oxid', 'lower', 'secondari', 'technic', 'alkalin', 'elimin', 'guidanc', 'improp', 'open', 'semisupervis', 'critic', 'understand', 'employ', 'introduc', 'present', 'dongdong', 'hydroelectr', 'leverag', 'osman', 'consum', 'variabl', 'actual', 'lack', 'comput', 'enabl',

'eventu', 'faculti', 'artifici', 'servic', 'huge', 'pendenc', 'smart', 'respons', 'gan', 'alabama', 'httpsdoiorgjesr', 'first', 'cep', 'green', 'failur', 'suppli', 'frequent', 'machin', 'biomass', 'lightningspe', 'specif}

Cluster: 14, with 7 paper/s had the following terms/topics ():

{'could', 'schedul', 'energi', 'budget', 'union', 'zhang', 'smooth', 'household', 'altern', 'ro', 'solv', 'li', 'small', 'number', 'support', 'result', 'cut', 'grant', 'offer', 'wwwelseviercomlocaters', 'f', 'improv', 'rang', 'gridscal', 'design', 'refer', 'cannot', 'particularli', 'list', 'countri', 'weaken', 'ancillari', 'award', 'syst', 'introduc', 'excel', 'mod', 'largest', 'meanwhil', 'becom', 'constraint', 'origin', 'similar', 'nation', 'convers', 'ibr', 'pv', 'approach', 'increasingli', 'po', 'optimis', 'uncertainiti', 'thapar', 'classif', 'code', 'flcorrespond', 'shift', 'delv', 'friendli', 'australian', 'knowledg', 'finding', 'welcom', 'rais', 'right', 'stg', 'charg', 'deakin', 'cant', 'also', 'x02', 'convent', 'three', 'keep', 'usag', 'inevit', 'variou', 'ifr', 'fund', 'immin', 'strength', 'util', 'twin', 'life', 'enhanc', 'samson', 'fuel', 'requir', 'use', 'coloni', 'set', 'popular', 'system', 'mizat', 'afl', 'expect', 'runaway', 'moreov', 'arbitrag', 'behalf', 'lead', 'well', 'pivot', 'fast', 'capabl', 'scheme', 'r', 'mix', 'illustr', 'httpdxdoiorgjenconman', 'option', 'underscor', 'place', 'entrepreneurship', 'black-', 'particular', 'readi', 'observ', 'biofuel', 'envi', 'fault', 'strain', 'stride', 'applic', 'found', 'decis', 'storg', 'tarmo', 'sciencedirect', 'stabil', 'last', 'photovolta', 'keyword', 'ad', 'contrast', 'chargingdischarg', 'deterior', 'properti', 'centr', 'integr', 'shaktisinghthaparedu', 'reach', 'intervent', 'provis', 'variet', 'updat', 'hybrid', 'regul', 'mini', 'seem', 'load', 'reveal', 'devic', 'notexce', 'incorpor', 'ying', 'format', 'complex', 'modern', 'aforement', 'voltag', 'sustain', '-', 'reinforc', 'seen', 'curtail', 'revis', 'dalian', 'grantaward', 'elsevi', 'penetr', 'accommod', 'furthermor', 'flexibl', 'measur', 'per', 'attent', 'price', 'tobia', 'strategi', 'nondispatch', 'permit', 'control', 'shave', 'august', 'springerlinkcom', 'annual', 'relief', 'deal', 'remot', 'core', 'great', 'mani', 'heat', 'electr', 'offgrid', 'access', 'co', 'flexibl', 'overconserv', 'psg', 'pfr', 'hub', 'function', 'reliabl', 'timescal', 'determini', 'two', 'age', 'import', 'paramet', 'ing', 'renew', 'zhou', 'sz', 'ish', 'properli', 'licens', 'roll', 'year', 'applixad', 'abc', 'show', 'mean', 'goal', 'optimiza', 'achiev', 'work', 'research', 'diesel', 'mukesh', 'matur', 'state', 'complementar', 'continuu', 'imr', 'univers', 'cost', 'mingz', 'analys', 'detect', 'transit', 'minut', 'later', 'publish', 'configur', 'realtim', 'homepag', 'victoria', 'concern', 'nanj', 'analysi', 'zzhouanlgov', 'term', 'case', 'face', 'economi', 'fiber', 'syncon', 'afghanistan', 'transform', 'black', 'e', 'along', 'tackl', 'deploy', 'prove', 'ultracapacitor', 'typic', 'power', 'disturb', 'china', 'capac', 'drawback', 'comparison', 'ten', 'h', 'b', 'characterist', 'depend', 'ule', 'area', 'educ', 'degra', 'factor', 'biggest', 'wangyingseucom', 'identifi', 'c', 'due', 'ba', 'affect', 'fiberimpl', 'dation', 'feasibl', 'market', 'predict', 'major', 'novemb', 'promis', 'solarwind', 'scale', 'clean', 'linear', 'utilizeth', 'substanti', 'environ', 'optim', 'genera', 'costeffect', 'increas', 'algorithm', 'frequenc', 'india', 'addit', 'modif', 'accept', 'fluctuat', 'lowinertia', 'need', 'good', 'ensur', 'comprehens', 'avail', 'therebi', 'deplet', 'signifi\xad', 'time', 'june', 'commerci', 'inform', 'analyz', 'limit', '@', 'milp', 'ticstochast', 'method', 'facilit', 'abl', 'temperatur', 'safe', 'weidong', 'interest', 'engin', 'homer', 'content', 'relat', 'one', 'novel', 'kaushikcesiitdernetin', 'receiv', 'ahmadiyahangar', 'intens', 'spill', 'remain', 'creativ', 'particl', 'daili', 'agricultur', 'product', 'solut', 'curv', 'ronment', 'help', 'ffr', 'current', 'dispatch', 'tradeoff', 'lation', 'council', 'bid', 'propos', 'idea', 'base', 'shakti', 'issu', 'ding', 'thu', 'tem', 'manag', 'includ', 'downward', 'finest', '--', 'co-fund', 'island', 'extern', 'ga', 'make', 'obtain', 'possibl', 'rural', 'manuscript', 'european', 'audun', 'avoid', 'march', 'besss', 'final', 'windbess', 'activ', 'futur', 'resist', 'cation', 'gridform', 'level', 'fortun', 'laboratori', 'wdlidluteducn', 'octob', 'pwwind', 'attract', 'step', 'resourc', 'irregular', 'uptak', 'ministri', 'focu', 'coordin', 'subhash', 'gener', 'gradual', 'ltd', 'non-commerci', 'techniqu', 'oper', 'low', 'better', 'shenglong', 'bess', 'respond', 'shed', 'model', 'adapt', 'wer', 'grow', 'truck', 'impact', 'implement', 'order', 'large-scal', 'zhi', 'hourli', 'satisfi', 'usa', 'plaum', 'freddi', 'tor', 'sourc', 'mechatron', 'cycl', 'exampl', 'abil', 'con', 'correspond', 'mark', 'grid-scal', 'deviat', 'utilis', 'keen', 'form', 'experi', 'weak', 'numer', 'stand', 'wileyonlinelibrarycomjournalstg', 'journal', 'therefor', 'mw', 'powerforecast', 'highinertia', 'fossil', 'intend', 'locat', 'start', 'wide', 'period', 'discharg', 'argonn', 'technolog', 'sensor', 'adequaci', 'optic', 'instabl', 'role', 'demand', 'sy', 'effort', 'wind', 'purpos', 'congest', 'densiti', 'int', 'hare', 'multityp', 'essenti', 'outag', 'cse', 'signific', 'invest', 'cleaner', 'integ', 'south', 'cite', 'lemont', 'scription', 'botterud', 'n', 'effect', 'doi', 'dso', 'converg', 'microgrid', 'commiss', 'pack', 'grid', 'cell', 'extend', 'verifi', 'citi', 'benefit', 'play', 'ccgpp', 'bioga', 'led', 'virtual', 'system', 'gasific', 'realiz', 'condit', 'connect', 'rich', 'lsbess', 'strategycan', 'qia', 'kept', 'conting', 'toward', 'theori', 'de', 'econom', 'attribution-noncommercial-noderiv', 'user', 'local', 'discuss', 'deficient', 'korotko', 'draw', 'littl', 'practic', 'autom', 'behavior', 'j', 'john', 'thermal', 'balanc', 'demonstr', 'roya', 'follow', 'consid', 'match', 'larg', 'timesequ', 'name', 'abstract', 'profit', 'com', 'sec', 'differ', 'v', 'baltic', 'l', 'consist', 'chandra', 'wang', 'bee', 'viabl', 'rosin', 'solar', 'residenti', 'especi', 'accur', 'instal', 'date', 'amend', 'procur', 'pso', 'one', 'condens', 'proport', 'onlin', 'devel', 'iet', 'estonia', 'ida-viru', 'act', 'flow', 'distribut', 'simul', 'lookahead', 'paper', 'artifici', 'ramp', 'nem', 'crosscheck', 'highvalu', 'among', 'backup', 'insuffici', 'ponent', 'exchang',

'interconnect', 'depart', 'qualiti', 'high', 'mitig', 'natur', 'overview', 'way', 'nari', 'new', 'peak', 'quickli', 'australia', 'center', 'septemb', 'region', 'build', 'haixia', 'potenti', 'howev', 'robust', 'evid', 'instrument', 'w', 'httpsdoiorgjrser', 'develop', 'appli', 'tallinn', 'dimin\xad', 'author', 'melbourn', 'arisen', 'monitor', 'suitabl', 'abovement', 'reduc', 'verifi', 'loss', 'synthet', 'opti', 'decommiss', 'bragg', 'abotterudanlgov', 'minimum', 'overcom', 'integra', 'problem', 'medium', 'vent', 'optimum', 'perform', 'maintain', 'intern', 'gasifi', 'compens', 'station', 'refract', 'surplu', 'email', 'multiregul', 'electrochem', 'inverterbas', 'res-domin', 'even', 'address', 'project', 'kaushik', 'made', 'hydro', 'regu\xad', 'key', 'environment', 'anoth', 'aid', 'transmiss', 'standalon', 'interrog', 'collabor', 'growth', 'program', 'farm', 'dingqiasgeprisgcccmon', 'global', 'challeng', 'school', 'line', 'compar', 'standard', 'batteri', 'framework', 'advantag', 'reserv', 'studi', 'context', 'remov', 'kwh', 'plant', 'indian', 'self-consumpt', 'iti', 'review', 'sc', 'valueatrisk', 'common', 'institut', '≈', 'tion', 'index', 'vre', 'gradient', 'like', 'degrad', 'isol', 'perspect', 'sched', 'fcass', 'unit', 'less', 'mukeshsinghthaparedu', 'promin', 'reason', 'singh', 'store', 'size', 'costbenefit', '\x01', 'patiala', 'drovtar', 'articl', 'synchron', 'lifespan', 'multipl', 'softwar', 'tool', 'vehicl', 'antipeak', 'southeast', 'provid', 'assess', 'dayahead', 'alon', 'advanc', 'efficienc', 'efficient', 'pressur', 'conduct', 'secur', 'il', 'largescal', 'swarm', 'recent', 'convert', 'inertia', 'second', 'viat', 'lion', 'grate', 'strengthen', 'sumption', 'repres', 'heavyduti', 'scenario', 'elimin', 'inadequ', 'aggreg', 'relev', 'open', 'critic', 'introduc', 'employ', 'present', 'fulfill', 'particip', 'full', 'gridsupport', 'consum', 'alle\xad', 'variabl', 'pvbiomass', 'delhi', 'risk', 'yu', 'estonian', 'histori', 'k', 'kaifengzhangseueduch', 'stochast', 'kaifeng', 'enabl', 'argo', 'vari', 'ope', 'servic', 'replic', 'sfr', 'smart', 'respons', 'sens', 'resili', 'failur', 'suppli', 'wiley', 'frequent', 'biomass', 'royaahmaditalteche', 'son', 'postpon', 'insuffici', 'estim', 'wwwelseviercomlocateenconman', 'type'}

Cluster: 3, with 1 paper/s had the following terms/topics:

{'heat', 'offgrid', 'abbrevi', 'howev', 'energi', 'nario', 'expand', 'constant', 'capex', 'altern', 'million', 'ment', 'hourli', 'result', 'import', 'author', 'exampl', 'renew', 'f', 'improv', 'correspond', 'versatil', 'emiss', 'wt', 'suitabl', 'four', 'year', 'gridscale', 'substitut', 'design', 'boil', 'sinc', 'envis', 'wendugeccutokyoacjp', 'cumul', 'list', 'reduc', 'achiev', 'du', 'countri', 'tank', 'form', 'research', 'alreadi', 'state', 'reservoir', 'maxim', 'lowcarbon', 'univers', 'reflect', 'cost', 'sth', 'therefor', 'journal', 'fossil', 'problem', 'point', 'juli', 'ammonia', 'perform', 'owe', 'homepag', 'aziz', 'flow', 'convers', 'pv', 'period', 'payback', 'approach', 'highest', 'plan', 'main', 'technolog', 'email', 'face', 'pari', 'term', 'demand', 'carrier', 'economy', 'januari', 'effort', 'muhammad', 'wind', 'coke', 'address', 'densiti', 'e', 'compat', 'right', 'charg', 'multigener', 'key', 'also', 'replac', 'mixedinteg', 'expenditur', 'embrittl', 'feedstock', 'exist', 'promot', 'soel', 'power', 'sta', 'china', 'object', 'shicheng', 'cash', 'program', 'global', 'meguroku', 'capac', 'integ', 'compar', 'peak', 'respect', 'n', 'ccp', 'b', 'characterist', 'soc', 'agreement', 'electrolysi', 'reserv', 'liu', 'studi', 'grid', 'invest\xad', 'cell', 'c', 'hydrogenammonia', 'sofc', 'fuel', 'ning', 'sce\xad', 'superior', 'ergi', 'technoeconom', 'zhiyuan', 'system', 'use', 'hydrogenbas', 'hydrogen', 'requir', 'ammoniabas', 'musd', 'multi', 'predict', 'focus', 'institut', 'xi'an', 'linear', 'promis', 'intermitt', 'clean', 'moreov', 'synthesi', 'turbine', 'optim', 'sector', 'agenda', 'econom', 'increas', 'discuss', 'addit', 'iron', 'sofca', 'mechan', 'less', 'accept', 'scheme', 'r', 'mix', 'us', 'pledg', 'timeofus', 'ensur', 'produc', 'avail', 'pbp', 'em', 'electrif', 'deplet', 'jiaotong', 'evalu', 'volumetr', 'maziziisutokyoacjp', 'consid', 'milp', '@', 'difficult', 'applic', 'httpsdoiorgjenconman', 'tokyo', 'japan', 'contribut', 'storag', 'differ', 'sciencedirect', 'dollar', 'identifi', 'infra\xad', 'l', 'photovolta', 'engin', 'bulk', 'ab', 'neutral', 'content', 'keyword', 'water', 'still', 'structur', 'opex', 'receiv', 'secur', 'product', 'solut', 'aspect', 'solar', 'reach', 'sofch', 'wen', 'industri', 'current', 'transport', 'recommend', 'en\xad', 'regul', 'scenario', 'carbon', 'hongo', 'propos', 'reveal', 'oxid', 'technic', 'onlin', 'base', 'relev', 'komaba', 'sever', 'manag', 'includ', 'sign', 'introduc', 'ga', 'urgent', 'posit', 'safeti', 'henc', 'lack', 'profit', 'crisi', 'multiphas', 'solid', 'consider', 'revis', 'profil', 'elsevi', 'bunkyo', 'penetr', 'capit', 'difficulti', 'backup', 'laboratori', 'attent', 'attract', 'price', 'oil', 'gravimetr', 'depart', 'chemic', 'high', 'gener', 'scienc', 'polici', 'ltd', 'green', 'cradletograv', 'oper', 'suppli', 'low', 'natur', 'favor', 'agent', 'upgrad', 'formul', 'wwwelseviercomlocateenconman', 'ongrid', 'suffer', 'electr'}

Cluster: 4, with 5 paper/s had the following terms/topics:

{'could', 'decid', 'decemb', 'httpswwwenergygovdownloadsdoepublicaccessplan', 'energi', 'feder', 'obrien', 'maximum', 'altern', 'real', 'number', 'small', 'solv', 'support', 'result', 'mpcc', 'grant', 'investig', 'perundurai', 'intellig', 'f', 'improv', 'offer', 'survey', 'diod', 'rang', 'hotspot', 'pattern', 'arbitrari', 'design', 'refer', 'u', 'cannot', 'list', 'owpmsm', 'compon', 'fpa', 'back', 'vi', 'ploss', 'introduc', 'engi', 'gmppt', 'bristol', 'directli', 'without', 'process', 'disadvantag', 'exhaust', 'emf', 'vsd', 'meanwhil', 'param', 'industrialautom', 'constraint', 'almost', 'terms—anomali', 'nation', 'fixed', 'convers', 'si', 'stator', 'pv', 'approach', 'reader', 'po', 'lookup', 'symmetr', 'bs', 'certain', 'wing', 'classif', 'synthes', 'occur', 'januari', 'graduati', 'texa', 'first', 'xplore', 'rdtrevisandiagov', 'education', 'byncnd', 'ub', 'right', 'chennai', 'decad', 'harvest', 'charg', 'nsc', 'give', 'also', 'confer', 'convent',

'titl', 'solarpow', 'easili', 'fact', 'three', 'keep', 'gafocv', 'variou', 'sensit', 'util', 'contract', 'life', 'ow', 'fitness',
'unabl', 'atteri', 'forc', 'sum', 'albuquerque', 'novemberdecemb', 'heavi', 'weight', 'nonuniform', 'closest', 'driven',
'configur', 'govern', 'construct', 'fuel', 'manceinadditionanobserverbasedpredictivevectorreson', 'ieee', 'requir',
'use', 'set', 'overal', 'system', 'probabl', 'popular', 'may', 'effi\xad', 'runaway', 'suggest', 'pmw', 'moreov',
'bipolar', 'darken', 'odd', 'sector', 'fusion', 'well', 'protect', 'fast', 'capabl', 'classic', 'plot', 'qingdao', 'irrevoc',
'decomposit', 'scheme', 'joseph', 'yuan', 'evprovid', 'r', 'network', 'illustr', 'scienc', 'cienci', 'opinion', 'mp', 'us',
'arbi', 'masoum', 'quick', 'particular', 'command', 'elud', 'highpow', 'note\xad', 'observ', 'photo', 'fault', 'effici',
'superi', 'applic', 'found', 'decis', 'incorrect', 'dynam', 'five', 'stag', 'tabl', 'sciencedirect', 'reza', 'error', 'stabil',
'inject', 'vsb', 'photovolta', 'inc', 'keyword', 'ad', 'a*', 'panigrahi', 'electron', 'tctpv', 'deterior', 'poor', 'hillclimb',
'tech\xad', 'republicationredistribut', 'psc', 'own', 'loword', 'reach', 'stead', 'intrins', 'hybrid', 'person', 'regul',
'multistag', 'httpcreativecommonsorglicensesbi', 'cpss', 'faster', 'devic', 'influenc', 'qdueducn', 'reveal', 'pmsm',
'tual', 'stack', 'neg', 'complex', 'mpo', 'sand', '*correspond', 'sixphas', 'voltage', '-', 'safeti', 'select',
'httpswwwieeepublicationsrightsindexhtml', 'loop', 'revis', 'duti', 'renoald', 'attack', 'seriesconnect', 'elsevi',
'version', 'furthermor', 'measur', 'save', 'vaobriesandiagov', 'zheng', 'valley', 'flexibl', 'around', 'gap',
'wuxinzhendueducn', 'attent', 'reproduc', 'usabl', 'permit', 'reduct', 'campu', 'extrem', 'strategi', 'control',
'simpli', 'wa', 'report', 'must', 'vp', 'august', 'central', 'asymmetr', 'read', 'deal', 'etc', 'nonlinear', 'insight', 'great',
'close', 'electr', 'mani', 'xiong', 'transact', 'access', 'compos', 'mpe', 'opencircuit', 'ment', 'thank', 'age', 'reliabl',
'two', 'evad', 'voltaic', 'function', 'acknowledg', 'paramet', 'nonconvent', 'renew', 'propuls', 'famou', 'licens',
'sponsor', 'toler', 'singl', 'group', 'input', 'vector', 'goal', 'mean', 'cumul', 'aakash', 'view', 'xiboyuanbristolacuk',
'achiev', 'stateofheart', 'work', 'bm', 'port', 'research', 'volt', 'state', 'contin', 'mohammad', 'univers', 'costli',
'cost', 'benefici', 'fl', 'juli', 'detect', 'slag', 'perman', 'publish', 'residu', 'nuclear', 'realtim', 'homepag', 'track',
'victoria', 'assum', 'senior', 'analysi', 'nois', 'case', 'committe', 'circuit', 'drive', 'might', 'e', 'brito', 'rao', 'obvious',
'zero', 'monic', 'mppt', 'typic', 'power', 'china', 'inaccur', 'slide', 'drawback', 'spv', 'comparison', 'bmss', 'h', 'b',
'characterist', 'depend', 'antiparallel', 'area', 'spev', 'wastag', 'factor', 'absent', 'serb', 'identifi', 'c', 'mainli', 'due',
'perturb', 'day', 'affect', 'et', 'assumpt', 'deep', 'perfor', 'bftmpp', 'pollin', 'higher', 'predict', 'coimbator', 'mpc',
'novemb', 'promis', 'aim', 'tech', 'electromot', 'ev', 'criteria', 'corr', 'owaday', 'substanti', 'environ', 'optim', 'bfot',
'equival', 'costeffect', 'highreli', 'quirement', 'stringcentr', 'increas', 'algorithm', 'addit', 'india', 'states', 'cowan',
'sandia', 'micropro', 'accept', 'nm', 'want', 'iment', 'classifi', 'sheik', 'need', 'offlin', 'exper', 'grown', 'good',
'ensur', 'inductor', 'avail', 'nonsinusoid', 'minim', 'whole', 'time', 'commerci', 'june', 'inform', 'evalu', 'analyz',
'increment', '©', 'bayesian', 'limit', 'see', 'filter', 'method', 'multimiss', 'assist', 'creat', 'abl', 'test', 'transistor',
'temperatur', 'honeywel', 'safe', 'angl', 'perfect', 'trari', 'interest', 'engin', 'fals', 'ekf', 'xibo', 'switch', 'content',
'simpl', 'one', 'cept', 'lubbock', 'novel', 'situat', 'receiv', 'intens', 'fuzzi', 'remain', 'abstract—th', 'solut', 'ctp',
'utah', 'dcdc', 'current', 'rodrigo', 'phase', 'dition', 'panel', 'restrict', 'propos', 'trol', 'noiseawar', 'base', 'mode',
'oscillationsfre', 'loopbas', 'issu', 'thu', 'flux', 'includ', 'manag', 'fdia', 'extern', 'ga', 'principl', 'make', 'obtain',
'possibl', 'manuscript', 'avoid', 'ripp', 'besss', 'march', 'final', 'vittalraottuedu', 'multiphas', 'tiphas', 'vir', 'futur',
'fig', 'resist', 'level', 'neglect', 'commun', 'torqu', 'kalman', 'laboratori', 'necessarili', 'step', 'octavian', 'octob',
'tte', 'influenc', 'resourc', 'irregular', 'mainten', 'compr', 'domest', 'colleg', 'ltd', 'broadli', 'tx', 'gener', 'techniqu',
'better', 'oper', 'low', 'plane', 'bess', 'dclink', 'gwo', 'model', 'adapt', 'suffer', 'power—voltage', 'abbrevi', 'root',
'impact', 'implement', 'order', 'bhim', 'upon', 'aakashhourecueduau', 'accord', 'constant', 'alway', 'usa',
'joondalup', 'sourc', 'cycl', 'worthi', 'student', 'con', 'sequenc', 'correspond', 'ilusa', 'fellow', 'ut', 'hemalatha',
'form', 'oscil', 'motor', 'bass', 'color', 'httpsdoiorgjegyr', 'peci', 'caus', 'bad', 'identific', 'journal', 'therefor',
'haifeng', 'eee', 'campaign', 'multiphasedriveswheremultipleplanesmustberegulatedatth', 'fossil', 'point',
'bdd', 'vol', 'suscept', 'energy', 'locat', 'solu', 'efficaci', 'puls', 'amp', 'rvv', 'discharg', 'subspac', 'edith', 'plan',
'technolog', 'irra', 'sensor', 'period', 'terms—batteri', 'iit', 'main', 'dianc', 'gba', 'effort', 'stealthi', 'wind', 'inaekf',
'purpos', 'wu', 'strong', 'abstract—gridscal', 'societi', 'disrupt', 'predefin', 'fivephas', 'wolf', 'replac', 'extens',
'fieldori', 'databas', 'essenti', 'outag', 'exist', 'actual', 'object', 'signific', 'karami', 'parallelseri', 'offic', 'worldwid',
'openend', 'kumar', 'n', 'effect', 'hodeeelabaffairsstjosephstechnologyacin', 'string', 'converg', 'doi', 'array',
'ncnd', 'cell', 'grid', 'discontin', 'extend', 'onboard', 'bioga', 'modifi', 'superior', 'virtual', 'mpp', 'simultan',
'bijaya', 'system', 'fcsmpcc', 'realiz', 'clear', 'sole', 'condit', 'permiss', 'connect', 'crucial', 'take', 'sensorless',
'kept', 'jodhpur', 'theori', 'de', 'steadyst', 'econom', 'user', 'digit', 'discuss', 'lar', 'threephas', 'cusum', 'hard',
'part', 'ter', 'data', 'ann', 'retain', 'practic', 'rootfind', 'modul', 'determin', 'behavior', 'j', 'undisturb', 'tune',
'thermal', 'httpsdoiorgtia', 'demonstr', 'nishantkumariitjacin', 'follow', 'sengunthar', 'consid', 'neural', 'larg',
'overcharg', 'noisi', 'differ', 'v', 'uk', 'erod', 'timat', 'burden', 'l', 'consist', 'wang', 'highli', 'presav', 'tradit', 'agnost',

'lose', 'ninephas', 'press', 'employe', 'doe', 'iaccr', 'power-curr', 'solar', 'especi', 'residenti', 'separ', 'combin', 'longer', 'primari', 'date', 'st', 'wholli', 'extract', 'gmpp', 'onlin', 'ratio', 'decreas', 'although', 'tia', 'sever', 'paidup', 'simul', 'posit', 'grey', 'calcul', 'bhukya', 'paper', 'vittal', 'xiaoqin', 'adelaid', 'niqu', 'candid', 'search', 'administr', 'fcsmpc', 'johni', 'among', 'difficulti', 'invert', 'al', 'saml', 'fewer', 'depart', 'significantli', 'sarika', 'high', 'qualiti', 'magnet', 'oriti', 'natur', 'way', 'new', 'overpr', 'subject', 'peak', 'udavalakshmi', 'australia', 'spond', 'mar', 'septemb', 'care', 'igbt', 'howev', 'abstract—thi', 'robust', 'sensingbas', 'easiest', 'mag', 'illinoi', 'other', 'durat', 'similarli', 'wwwelseviercomlocateegy', 'develop', 'appli', 'powervoltag', 'basic', 'threshold', 'author', 'irradi', 'februari', 'plossinductor', 'totalcross', 'easi', 'monitor', 'prototyp', 'figure', 'acceler', 'kind', 'fundament', 'reduc', 'averag', 'verifi', 'loss', 'speed', 'subsidiari', 'utc', 'maxim', 'overcom', 'problem', 'har', 'fellowship', 'download', 'suar', 'perform', 'concept', 'intern', 'net', 'insulatedg', 'foundat', 'chang', 'banu', 'reservoirmodelandthestatesareestimatedusingtheinaekfth', 'bollipo', 'contain', 'malfunct', 'email', 'meet', 'pass', 'hensiv', 'httpsdoiorgti', 'mph', 'ideal', 'valu', 'previou', 'corrupt', 'xinzheng', 'even', 'address', 'discret', 'made', 'horizon', 'chronou', 'environment', 'tie', 'converter', 'exhibit', 'signal', 'amplitud', 'terms—model', 'target', 'equip', 'nowaday', 'program', 'logic', 'global', 'school', 'line', 'compar', 'compromis', 'syn', 'architectur', 'short', 'llc', 'standard', 'batteri', 'nonexclus', 'mul', 'soc', 'sup', 'advantag', 'chair', 'sudden', 'reserv', 'studi', 'public', 'beetl', 'adjac', 'indian', 'uniform', 'fer', 'light', 'fraction', 'review', 'ac', 'httpcreativecommonsorglicensesbyncnd', 'institut', 'intermitt', 'synthesi', 'pollut', 'partial', 'index', 'entir', 'tion', 'aerospac', 'remark', 'finite', 'like', 'valid', 'degrad', 'vspc', 'unit', 'allow', 'stage', 'zhengxi', 'kota', 'damag', 'singh', 'direct', 'space', 'size', 'fall', 'techniquesbas', 'cyberphys', 'produc', 'correl', 'flower', 'oscillationfre', 'electrif', 'focv', 'articl', 'synchron', 'bft', 'topolog', 'softwar', 'indirajith', 'httpsdoiorgjenconman', 'approv', 'g', 'literatur', 'vehicl', 'assess', 'provid', 'member', 'smoke', 'efficient', 'bypass', 'orem', 'rate', 'genet', 'describ', 'shade', 'conduct', 'secur', 'ketan', 'antenna', 'swarm', 'nine', 'neer', 'industri', 'memori', 'hassan', 'vulner', 'transport', 'gonçalv', 'output', 'repres', 'cc', 'express', 'lower', 'secondari', 'technic', 'choos', 'trevizan', 'elimin', 'board', 'open', 'understand', 'critic', 'harmon', 'introduc', 'employ', 'present', 'occurr', 'variabl', 'delhi', 'k', 'histori', 'dena', 'aoqinqdueducn', 'comput', 'multivari', 'cessor', 'vari', 'bode', 'artifici', 'respons', 'smart', 'es', 'first', 'nishant', 'tamilnadu', 'suppli', 'april', 'matlabsimulink', 'failur', 'machin', 'frequent', 'modelbas', 'estim', 'wwwelseviercomlocateenconman', 'type'}

Cluster: 17, with 8 paper/s had the following terms/topics:

{'explor', 'could', 'decemb', 'summit', 'eastern', 'ion', 'energi', 'commit', 'budget', 'expand', 'union', 'pseudosecond', 'zhang', 'synthesis', 'feder', 'ningbo', 'altern', 'gao', 'render', 'number', 'solv', 'support', 'q', 'result', 'indirectli', 'grant', 'investig', 'offer', 'f', 'improv', 'recogn', 'notabl', 'rang', 'design', 'refer', 'safeguard', 'cannot', 'field', 'list', 'chmohgama@gmailcom', 'countri', 'ph', 'scientist', 'compon', 'stamina', 'guidelin', 'drabbasjaffaroutlookcom', 'accomplish', 'path', 'excel', 'statist', 'wastewat', 'directli', 'without', 'process', 'largest', 'across', 'issuanc', 'freshwat', 'desalination', 'battl', 'origin', 'haz\xad', 'meshari', 'cheng', 'explanatori', 'nation', 'unpreced', 'entail', 'almost', 'convers', 'badeeb', 'pv', 'approach', 'adsorbent', 'po', 'corridor', 'groundwat', 'cop', 'classif', 'deleg', 'poverti', 'pv', 'cooper', 'januari', 'shift', 'graduat', 'friendli', '↑correspond', 'sjtu', 'purifi', 'finding', 'empir', 'right', 'decad', 'wei', 'ycncom', 'mubark', 'also', 'mahmoodsduteducn', 'ögo', 'largescal', 'convent', 'quantiti', 'x\x01', 'mersin', 'media', 'hoocom', 'pave', 'fact', 'find', 'keep', 'greenhous', 'fund', 'variou', 'tainabl', 'strength', 'util', 'stabl', 'life', 'riazswlhotmailcom', 'threat', 'forc', 'ultim', 'adequ', 'enhanc', 'zahoor', 'wellb', 'driven', 'mit', 'excess', 'govern', 'fuel', 'requir', 'use', 'rel', 'popular', 'di', 'may', 'expect', 'upsurg', 'suggest', 'aftermath', 'adsorptiondesorpt', 'moreov', 'changyong', 'come', 'thermodynam', 'lead', 'pose', 'sector', 'pioneer', 'well', 'pivot', 'protect', 'capabl', '~', 'nevertheless', 'zachariadi', 'regard', 'r', 'network', 'asian', 'place', 'declin', 'handl', 'izat', 'zeeshan', 'paradigm', 'pore', 'doha', 'expans', 'exacerb', 'man\xad', 'observ', 'combat', 'decentr', 'effici', 'portfolio', 'textil', 'found', 'twomod', 'applic', 'deple\xad', 'within', 'sciencedirect', 'photovolta', 'coastal', 'keyword', 'deterior', 'infrastructur', 'temper\xad', 'properti', 'except', 'garg', 'centr', 'integr', 'footprint', 'reach', 'isotherm', 'cuss', 'behnken', 'regul', 'ag', 'mou', 'reveal', 'influenc', 'verbic', 'httpcreativecommonsorglicensesbi', 'incorpor', 'strateg', 'popzigsueducn', 'neg', 'modern', 'desalin', 'climat', 'sustain', '—', 'environmentfriendly', 'safeti', 'world', 'seen', 'bv', 'revis', 'dalian', 'financial', 'conduc', 'ecofriendli', 'elsevi', 'penetr', 'furthermor', 'matter', 'gdp', 'peopl', 'fiscal', 'per', 'netzero', 'save', 'mmolg', 'price', 'spatial', 'strategi', 'reduct', 'control', 'hbond', 'relationship', 'box', 'clearli', 'goa', 'electrostat', 'core', 'great', 'mani', 'electr', 'oret', 'leng', 'co', 'access', 'xrd', 'pandem', 'finan', 'ment', 'reliabl', 'ye', 'import', 'shanghai', 'outcom', 'paramet', 'ing', 'renew', 'wwwjournalselseviercomprocesssafetyandenvironmentalprotect', 'zhou', 'forwardthink', 'phpzc', 'properli',

'compel', 'economies☆', 'licens', 'year', 'haspolat', 'group', 'today', 'goal', 'view', 'mean', 'show', 'achiev', 'via', 'z', 'significantli', 'work', 'beijingtianjinhebei', 'port', 'research', 'financ', 'lowcarbon', 'univers', 'sari', 'cost', 'ashraf', 'analys', 'patent', 'signific', 'transit', 'islamabad', 'paramount', 'mental', 'door', 'publish', 'releas', 'later', 'movement', 'sorption', 'accumul', 'mere', 'homepag', 'road', 'concern', 'confirm', 'financi', 'princess', 'mayzjuteducn', 'analysi', 'moham', 'devel\xad', 'study', 'term', 'economi', 'encourag', 'tu', 'warm', 'drive', 'transform', 'e', 'agmof', 'abdurahman', 'inhabit', 'along', 'incopat', 'bound', 'justic', 'arabia', 'ionic', 'submit', 'jaffar', 'qiu', 'qatar', 'power', 'china', 'riaz', 'adopt', 'world', 'trade', 'biostain', 'malachit', 'dispar', 'ocean', 'spontan', 'inorganicorgan', 'sinha', 'pearl', 'ramez', 'cpec', 'highlight', 'assert', 'h', 'consequ', 'b', 'tabuk', 'throughout', 'depend', 'characterist', 'area', 'educ', 'aris', 'p', 'authorship', 'factor', 'filter', 'c', 'due', 'mainli', 'ahmad', 'affect', 'et', 'wellfit', 'mote', 'cypru', 'taxat', 'alshareef', 'higher', 'market', 'saiya', 'httpsdoiorgjpsep', 'major', 'novemb', 'promis', 'clean', 'scale', 'ural', 'abba', 'air', 'tech', 'substanti', 'environ', 'catch', 'su', 'increas', 'drastic', 'addit', 'sem', 'india', 'formul', 'oppos', 'renew\xad', 'street', 'wwwelseviercomlocateresourpol', 'accept', 'basi', 'minhang', 'elmetwali', 'need', 'lipe', 'bibliometr', 'atmospher', 'reus', 'avail', 'drink', 'haiyan', 'jiaotong', 'time', 'commerci', 'evalu', 'inform', 'analyz', '©', 'imped', 'method', 'eldesouki', 'creat', 'node', 'abl', 'velop', 'temperatur', 'harm', 'δs°', 'ajl', 'district', 'fñ', 'magnitud', 'yan', 'engin', 'alsulati', 'ab', 'urbaniza', 'content', 'simpl', 'relat', 'one', 'water', 'wwwelseviercomlocategr', 'receiv', 'social', "“triangular”", "“residenti", 'httpsdoiorg', 'product', 'solut', 'contemporari', 'op\xad', 'nourah', 'shujaatabbassgmailcom', 'current', 'philippin', 'lation', 'analyt', 'panel', 'restrict', 'carbon', 'propos', 'quantil', 'stimul', 'base', 'turkey', 'mof', 'longterm', 'jiang', 'issu', 'makkah', 'thu', 'includ', 'manag', 'ding', 'ga', 'wenzhoues', 'sorbent', 'obtain', 'urgent', 'shujaat', 'european', 'enterpris', 'type', 'march', 'henc', 'chen', 'emerg', 'agement', 'regu', 'climaterel', 'confront', 'activ', 'futur', 'unrestrict', 'profil', 'httpsdoiorgjgr', 'landscap', 'level', 'mostli', 'rise', 'commun', 'laboratori', 'marxism', 'heighten', 'attract', 'consumpt', 'influenc', 'resourc', 'uptak', 'ministri', 'wwwtandfonlinecomjournalstdw', 'focu', 'bric', 'aljahani', 'polici', 'craft', 'scienc', 'gener', 'colleg', 'ltd', 'domest', 'damietta', 'techniqu', 'low', 'better', 'river', 'community", 'adapt', 'model', 'foster', 'grow', 'rapidli', 'afford', 'saboori', 'surprisingli', 'ren', 'ccemg', 'impact', 'nece', 'implement', 'order', 'billion', 'accord', 'elbindari', 'five', 'preindustri', 'estim', 'section', 'decisionmak', 'sourc', 'cycl', 'priorit', 'abil', 'con', 'correspond', 'mark', 'hinder', 'four', 'xian', 'chengnuo', 'beirut', 'surfac', 'form', 'color', 'caus', 'onto', 'journal', 'resourceeffici', 'dye', 'therefor', 'past', 'fossil', 'langmuir', 'vol', 'urg', 'nov', 'kanxiang', 'httpsdoiorgjresourpol', 'efficaci', 'cope', 'wide', 'linkag', 'technolog', 'equal', 'ckchenzjuteducn', 'chines', 'yang', 'role', 'demand', 'sy', 'jiao', 'moment', 'unintent', 'dosag', 'ie', 'wu', 'strong', 'gase', 'howel', 'scatter', 'societi', 'alongsid', 'cial', 'ππ', 'field', 'hangzhou', 'alrayyan', 'akif', 'ardou', 'databas', 'essenti', 'adsorb', 'lebanes', 'sun', 'signific', 'object', 'invest', 'cleaner', 'wit', 'zhijiang', 'cite', 'wwwelseviercomlocatees', 'n', 'effect', 'explain', 'doi', 'xiyu', 'adsorpt', 'raza', 'cell', 'china", 'citi', 'ecija', 'play', 'propylen', 'simultan', 'δh°', 'led', 'shaobin', 'abbasue840', 'collab\xad', 'system', 'yangxiyuemaildluteducn', 'frameworkbas', 'bint', 'realiz', 'unlock', 'take', 'connect', 'crucial', 'indu', 'condit', 'grave', 'phenomena', 'statement', 'kept', 'toward', 'de', 'econom', 'zhouhaiyanshotmailcom', 'local', 'discuss', 'mechan', 'part', 'progress', 'busi', 'data', 'practic', 'polypropylen', 'opportun', 'examin', 'bond', 'hu', 'tune', 'mg', 'demonstr', 'testament', 'cd', 'khalid', 'batch', 'abstract', 'boxbehnken', 'contribut', 'pakistan', 'com', 'jel', 'differ', 'uk', 'serv', 'sector", 'conclus', 'l', 'wang', 'highli', 'rapid', 'recoveri', 'tradit', 'mobil', 'neutral', 'salhah', 'humankind', 'beij', 'structur', 'eyewit', 'sna', 'bet', 'solar', 'especi', 'gongshang', 'residenti', 'sagepubcomjournalspermiss', 'sdg', 'adnan', 'extract', 'wenzhou', 'character', 'proactiv', 'onlin', 'ratio', 'scientif', 'ecolog', "“water", 'mahmood', 'decreas', 'long', 'riyadh', 'ftir', 'obor', 'sever', 'bjj', 'causal', 'human', 'ilma', 'posit', 'dr', 'atur', 'paper', 'x@', 'eco', 'ale', 'administr', 'total', 'alhamd', 'highvalu', 'mesopor', 'among', 'trend', 'al', 'sampl', 'exchang', 'tourism', 'depart', 'chemic', 'significantli', 'qualiti', 'high', 'usd', 'call', 'mitig', 'quan', 'natur', 'way', 'egyptian', 'pursuit', 'new', 'nashwa', 'russian', 'clarifi', 'peak', 'dongchuan', 'center', '☆thi', 'oleg', 'region', 'septemb', 'provinc', 'foreign', 'potenti', 'indic', 'mgg', 'obobisa', 'instrument', 'planner', 'print', 'megaproject', 'yangtz', 'mariev', 'develop', 'appli', 'tile', 'gondwana', 'usher', 'spiral', 'basic', 'privat', 'evolut', 'shah', 'author', 'februari', 'cyclabl', 'monitor', 'benefit', 'methodolog', 'emiss', 'innov', 'alqahtani', 'feng', 'acceler', 'reduc', 'hydrogen"', 'loss', 're\xad', 'akimoto', 'xuanmei', 'shahbaz', 'tribut', 'faviksiimidracin', 'nonrenew', 'climatetech', 'crossmark', 'inequ', 'problem', 'httpswwwtandfonlinecomactionjournalinformationjournalcodetsdw', 'concept', 'initi', 'mohamedeldesokyeppegcom', 'intern', 'elgomhoria', 'ceec', 'chal\xad', 'quel', 'foundat', 'chang', 'kassar', 'ibrahim', 'pro', 'email', 'eu', 'meet', 'rd', 'ummalqura', 'era', 'belt', 'muhammad', 'abubakr', 'celsiu', 'mansoura',

'address', 'project', 'fiscal', 'coefficient', 'zhejiang', 'nueva', 'crossregion', '"green', 'delta', 'rsm', 'key', 'faisal', 'khan', 'ahm', 'environment', 'communities', 'degre', 'collabor', 'promot', 'target', 'igat', 'domin', 'growth', 'equip', 'kait', 'global', 'avik', 'challeng', 'logic', 'school', 'metalorgan', 'antai', 'xp', 'oecd', 'zahoorahmedya', 'necessari', 'short', 'instanc', 'respect', 'vigor', 'cabanatuan', 'reserv', 'studi', 'portun', 'remov', 'proof', 'popul', 'tri', 'plant', 'context', 'saudi', 'concentr', 'light', 'distinct', 'orat', 'hydrogen', 'fill', 'review', 'nolog', 'common', 'focus', 'institut', 'xi'an', 'pollut', 'editor', 'tion', 'emphas', 'phone', 'action', 'tinuou', 'interact', 'destek', 'shiy', 'link', 'degrad', 'perspect', 'kinet', 'planet', 'unit', 'allow', 'partnership', 'islam', 'stage', 'end', 'egypt', 'chemistri', 'correl', 'direct', 'size', 'pledg', 'american', 'produc', '\x01', 'compani', 'articl', 'tool', 'g', 'share', 'alloc', 'intric', 'equat', 'assess', 'expedit', 'lebanon', 'provid', 'gender', 'attach', 'residents', 'involv', 'brigg', 'advanc', 'irrig', 'policymak', 'member', 'efficienc', 'opment', 'derbi', 'rate', 'x', 'associ', 'peac', 'describ', 'conduct', 'impend', 'widespread', 'largescal', 'zibo', 'qqcom', 'cofirst', 'recent', 'industri', 'karachi', 'transport', 'recommend', 'strengthen', 'advers', 'cc', 'account', 'endotherm', 'issn', 'competit', 'open', 'critic', 'roadmap', 'introduc', 'employ', 'said', 'bbd', 'hao', 'zahoorahmedyahoo', 'kinship', 'particip', 'present', 'full', 'tong', 'wast', 'impli', 'consum', 'variabl', 'normal', 'lack', 'mehmet', 'onemod', 'k', 'journalssagepubcomhomeerx', 'histori', 'capit', 'enabl', 'zeng', 'bc†', 'conserv', 'faculti', 'shandong', 'huge', 'httpsdoiorgjesr', 'respons', 'greatest', 'first', 'resili', 'green', 'huhaostaffshueducn', 'suppli', 'april', '"transportation"', 'favor', 'upgrad', 'specif', 'stringent', 'east'}

Cluster: 9, with 1 paper/s had the following terms/topics:

{'decemb', 'howev', 'impact', 'energi', 'conjunct', 'milan', 'evid', 'accord', 'thank', 'opposit', 'appli', 'epia', 'support', 'hourli', 'result', 'sufficient', 'wwwelseviercomlocateenpol', 'sourc', 'author', 'renew', 'f', 'correspond', 'year', 'view', 'list', 'reduc', 'via', 'averag', 'form', 'constitut', 'incent', 'conto', 'caus', 'massiv', 'cessarili', 'cost', 'journal', 'directli', 'twh', 'juli', 'subsequ', 'initi', 'battl', 'intern', 'terna', 'compens', 'homepag', 'nation', 'itali', 'benton', 'chang', 'pv', 'period', 're', 'surplu', 'grew', 'email', 'case', 'yet', 'economi', 'endus', 'alessandra', 'occur', 'demand', 'undergon', 'wholesal', 'wind', 'httpdxdoiorgjenpol', 'first', 'address', 'meritord', 'empir', 'finding', 'e', 'margin', 'right', 'also', 'università', 'transmiss', 'usual', 'zoppoli', 'reflect', 'promot', 'power', 'signific', 'growth', 'mef', 'invest', 'del', 'latter', 'capac', 'premium', 'worldwid', 'respect', 'effect', 'n', 'h', 'certific', 'b', 'pietro', 'volatil', 'disclaim', 'reserv', 'italian', 'stefano', 'c', 'mainli', 'energia', '☆we', 'system', 'known', 'di', 'higher', 'market', 'cover', 'intermitt', 'novemb', 'iea', 'p', 'entir', 'substanti', 'cataldi', 'econom', 'gw', 'increas', 'ne', 'official', 'amplifi', 'feedin', 'tariff', 'accept', 'scheme', 'quantit', 'data', 'r', 'promin', 'treasuri', 'declin', 'michael', 'avail', '\x01', 'time', 'gwh', 'articl', 'analyz', 'demmm-depart', 'method', 'g', 'within', 'sciencedirect', 'provid', 'dayahead', 'l', 'clò', 'photovolta', 'relat', 'content', 'keyword', 'one', 'financemef', 'monetari', 'receiv', 'subsid', 'record"', 'rate', 'daili', 'vestment', 'product', 'gme', 'emanuel', '€mw', 'comment', 'solar', 'recent', 'instal', 'find', 'phase', 'grate', 'repres', 'express', 'susan', 'onlin', 'recess', 'former', 'decreas', 'relev', 'write', 'manag', 'introduc', '—', 'impress', 'consum', 'dt', 'posit', 'world', 'paper', 'undisput', 'crisi', 'revis', 'histori', 'financial', 'fig', 'total', 'bacchiocchi', 'spa', 'elsevi', 'among', 'save', '"an', '€mwh', 'price', 'stefanoclounimiit', 'ministri', 'depart', 'reduct', 'high', 'gener', 'polici', 'conservatorio', 'ltd', 'green', 'milano', 'surg', 'oper', 'annual', 'estim', 'electr'}

Cluster: 18, with 4 paper/s had the following terms/topics:

{'could', 'sxwangtjueducn', 'polytechn', 'wwwelseviercomlocateapenergi', 'xu', 'energi', 'commit', 'zhang', 'fossilfuel', 'real', 'support', 'result', 'sufficient', 'sipreólico', 'grant', 'intellig', 'britain', 'investig', 'f', 'improv', 'ob', 'much', 'germani', 'list', 'simplic', 'olausongmailcom', 'countri', 'heurist', 'nsw', 'tempor', 'contrari', 'detail', 'introduc', 'kong', 'statist', 'hulunbuir', 'turn', 'mod', 'directli', 'without', 'process', 'wavelet', 'across', 'becom', 'constraint', 'origin', 'similar', 'nonparametr', 'nation', 'pv', 'approach', 'po', 'physic', 'certain', 'uncertainty', 'complic', 'friendli', 'knowledg', 'first', 'xplore', 'empir', 'resampl', 'decad', 'right', 'give', 'also', 'calliop', 'convent', 'three', 'fact', 'sensit', 'util', 'stabl', 'erat', 'weight', 'adequ', 'deregul', 'correct', 'either', 'lei', 'construct', 'success', 'ieee', 'requir', 'use', 'set', 'iiasa', 'popular', 'probabl', 'may', 'mizat', 'northwest', 'suggest', 'aftermath', 'specific', 'turbin', 'bonnevil', 'downscal', 'hand', 'pfenning', 'decomposit', 'regard', 'r', 'network', 'ramet', 'assump', 'resolut', 'handl', 'particular', 'clarkson', 'observ', 'five', 'enc', 'arma', 'applic', 'freeli', 'span', 'dynam', 'decis', 'fore', 'storag', 'sciencedirect', 'error', 'last', 'ex', 'ny', 'photovolta', 'rule', 'confidenc', 'keyword', 'record"', 'electron', 'poli', 'taken', 'matlab', 'centr', 'republicationredistribut', 'integr', 'reach', 'updat', 'depict', 'hybrid', 'choic', 'temper', 'person', 'nasa', 'stefanpfenningerussethzh', 'httpcreativecommonsorglicensesbi', 'coher', 'conveni', 'denot', 'yamin', 'format', 'complex', 'modern', 'climat', 'h€', '—', 'interv', 'infer', 'proach', 'ahead', 'seen', 'learn', 'hardli', 'revis', 'consider', 'awpp', 'elsevi', 'penetr', 'version', 'eth', 'measur', 'flexibl', 'highresolut', 'per', 'siti', 'around', 'permit', 'reduct', 'extrem', 'control', 'wherebi', 'wa', 'august', 'annual', 'analyst', 'deal', 'etc', 'pre', 'nonlinear', 'great', 'benchmark', 'electr', 'mani', 'transact', 'access', 'newli', 'rbf', 'ment', 'na', 'function', 'reliabl',

'two', 'potsdam', 'beforehand', 'navig', 'wppt', 'import', 'count', 'paramet', 'liabl', 'renew', 'tekniska', 'forecast', 'licens', 'year', 'iii', 'heavili', 'group', 'input', 'singl', 'show', 'today', 'vector', 'mean', 'via', 'z', 'significantli', 'work', 'research', 'en', 'univers', 'cost', 'analys', 'juli', 'transit', 'publish', 'releas', 'homepag', 'highresolv', 'senior', 'analysi', 'term', 'case', 'face', 'domain', 'sweden', 'absolut', 'might', 'transform', 'e', 'deploy', 'dispers', 'experiment', 'usual', 'typic', 'power', 'china', 'forelectricitygenerationth', 'trade', 'capac', 'radial', 'comparison', 'met', 'h', 'tractabl', 'b', 'characterist', 'depend', 'educ', 'factor', 'p', 'treme', 'biggest', 'identifi', 'c', 'reanalysi', 'due', 'affect', 'ltc', 'assumpt', 'hailaer', 'bp', 'undergo', 'glo', 'el', 'kernel', 'higher', 'train', 'predict', 'assimil', 'linear', 'larger', 'promis', 'clean', 'major', 'scale', 'franc', 'novemb', 'optim', 'environmen', 'increas', 'algorithm', 'addit', 'frequenc', 'bpa', 'formul', 'wong', 'basi', 'accept', 'inner', 'terval', 'accuraci', 'need', 'good', 'ensur', 'atmospher', 'predecessor', 'reanalys', 'avail', 'gen', 'interannu', 'time', 'june', 'inform', 'analyz', 'limit', '@', 'univ', 'see', 'method', 'abl', 'searcher', 'aim', 'engin', 'olauson', 'ogskolan', 'relat', 'content', 'one', 'hour', 'novel', 'pinson', 'receiv', 'move', 'probabilist', 'kungliga', 'eemd', 'remain', 'particl', 'sential', 'product', 'solut', 'reanalysi', 'curv', 'help', 'given', 'accu', 'regress', 'meteorolog', 'current', 'dition', 'setup', 'restrict', 'propos', 'quantil', 'kitpoieeorg', 'base', 'mode', 'hia', 'deriv', 'switzerland', 'longterm', 'tem', 'includ', 'tiam', 'ga', 'resolu', 'obtain', 'make', 'possibl', 'manuscript', 'march', 'crisi', 'horizont', 'elm', 'agenc', 'fatur', 'eezhaoxupolyueduhk', 'level', 'ap', 'rise', 'pare', 'laboratori', 'octob', 'step', 'oil', 'consumpt', 'callaghan', 'resourc', 'ministri', 'polici', 'scienc', 'gener', 'ltd', 'autoregress', 'gradual', 'better', 'techniqu', 'low', 'oper', 'adapt', 'model', 'wer', 'grow', 'root', 'impact', 'implement', 'order', 'stationari', 'alway', 'ation', 'estim', 'zydongieeorg', 'hourli', 'decisionmak', 'usa', 'sourc', 'exempl', 'student', 'abil', 'httpieeexploreieeorg', 'con', 'correspond', 'wt', 'gm', 'fellow', 'pi', 'rithm', 'form', 'ref', 'shown', 'color', 'numer', 'journal', 'tianjin', 'therefor', 'abstract—accur', 'past', 'point', 'min', 'talli', 'nwp', 'hom', 'vol', "country", 'wan', 'locat', 'appear', 'wide', 'sydney', 'period', 'kit', 'reprocess', 'httpdxdoiorgjrenen', 'plan', 'technolog', 'main', 'chaotic', 'quantifi', 'httpwwwieeorgpublicationsstandardspublicationsrightsindexhtml', 'yang', 'modemix', 'algo', 'nonstationar', 'sy', 'divis', 'esti', 'ie', 'wind', 'wu', 'purpos', 'densiti', 'pc', 'pierr', 'field', 'swedish', 'experieenc', 'extends', 'segment', 'exist', 'essenti', 'object', 'signific', 'tran', 'cite', 'would', 'ppinelektrodtudk', 'n', 'effect', 'weather', 'element', 'grid', 'extend', 'zürich', 'benefit', 'countrywis', 'pa', 'http', 'system', 'fastest', 'formanc', 'se', 'condit', 'permiss', 'crucial', 'tain', 'onesizefitsal', 'stockholm', 'econom', 'local', 'digit', 'gw', 'implic', 'coverag', 'part', 'seri', 'data', 'canwanconnectpolyuhk', 'practic', 'determin', 'demonstr', 'name', 'neural', 'gineer', 'batch', 'eg', 'kg', 'com', 'differ', 'conclus', 'l', 'consist', 'wang', 'highli', 'decompos', 'mongolia', 'tradit', 'champion', 'structur', 'aspect', 'solar', 'accur', 'instal', 'combin', 'jon', 'date', 'western', 'procur', 'forth', 'metric', 'extract', 'psa', 'prior', 'inter', 'onlin', 'convinc', 'former', 'long', 'hung', 'distribut', 'downsaml', 'simul', 'grey', 'calcul', 'atur', 'paper', 'artifici', 'adelaid', 'administr', 'erainterim', 'saml', 'desir', 'slightli', 'depart', 'unreli', 'high', 'qualiti', 'tn', 'academia', 'newcastl', 'new', 'australia', 'septemb', 'potenti', 'howev', 'cluster', 'robust', 'w', 'cast', 'rel', 'develop', 'appli', 'rgc', 'author', 'creativecommonsorglicensesbi', 'februari', 'suitabl', 'gabp', 'figure', 'extent', 'stefan', 'ind', 'limeseu', 'fundament', 'reduc', 'averag', 'opti', 'speed', 'utc', 'minimum', 'terms—extrem', 'kth', 'hong', 'integra', 'problem', 'fellowship', 'download', 'squar', 'perform', 'intern', 'grf', 'svm', 'chang', 'fluctuat', 'meaning', 'km', 'daybyday', 'email', 'phd', 'ensembl', 'valu', 'era', 'even', 'address', 'lyngbi', 'diction', 'key', 'approxim', 'environment', 'aid', 'difficult', 'signal', 'individu', 'httpdxdoiorgjapenergi', 'growth', 'royal', 'tric', 'program', 'global', 'farm', 'unavoid', 'challeng', 'best', 'school', 'compar', 'histor', 'necessari', 'bal', 'short', 'instanc', 'quot', 'final', 'framework', 'advantag', 'context', 'studi', 'reserv', 'reli', 'often', 'public', 'ckd', 'common', 'ac', 'focus', 'institut', 'intermitt', 'iea', 'tion', 'index', 'tpwr', 'ii', 'like', 'generaliz', 'allow', 'unit', 'zhao', 'ultrashort', 'uniqu', 'fall', 'space', 'correl', 'hourbyhour', 'size', 'direct', 'produc', 'prepar', '\x01', 'articl', 'merra', 'multipl', 'tool', 'g', 'share', 'provid', 'un', 'member', 'involv', 'advanc', 'efficienc', 'efficient', 'rate', 'pressur', 'associ', 'genet', 'describ', 'commonli', 'conduct', 'denmark', 'httpsdoiorgjrenen', 'mate', 'swarm', 'recent', 'interyear', 'convert', 'industri', 'ture', 'transport', 'uppsala', 'output', 'scenario', 'cc', 'opensourc', 'lower', 'technic', 'aggreg', 'relev', 'competit', 'open', 'introduc', 'present', 'particip', 'dong', 'impli', 'variabl', 'appropri', 'risk', 'duce', 'k', 'histori', 'stochast', 'comput', 'shouxiang', 'emd', 'vari', 'site', 'elec', 'smart', 'es', 'height', 'suppli', 'april', 'machin', 'sharp', 'wwwelseviercomlocaterenen'}

Cluster: 19, with 3 paper/s had the following terms/topics:

{'explor', 'wwwelseviercomlocateapenergi', 'decemb', 'httpsdoiorgjenergi', 'xu', 'schedul', 'energi', 'unpredict', 'zhang', 'ðrei', 'solv', 'number', 'li', 'real', 'dioxid', 'seyi', 'result', 'investig', 'f', 'togeth', 'improv', 'inher', 'recogn', 'arbitrari', 'design', 'cplex', 'list', 'compon', 'heurist', 'automot', 'introduc', 'slime', 'without', 'process', 'constraint', 'chp', 'nation', 'gird', 'si', 'pv', 'approach', 'po', 'uncertainty', 'stor', 'katayoun', 'complic', 'januari',

'shift', '↑correspond', 'first', 'xplore', 'right', 'charg', 'also', 'hossein', 'convent', 'pev', 'find', 'variou', 'util', 'sum', 'enhanc', 'spite', 'fuel', 'Oieee', 'requir', 'use', 'known', 'di', 'may', 'mh', 'cool', 'moreov', 'turbin', 'lead', 'pose', 'acir', 'well', 'capabl', 'strictli', 'compris', 'hand', 'regard', 'r', 'mix', 'handl', 'effec\xad', 'effici', 'applic', 'dynam', 'within', 'storg', 'gam', 'sciencedirect', 'error', 'kn', 'photovolta', 'keyword', 'recours', 'amrollahi', 'ad', 'republicationredistribut', 'integ', 'ci', 'di', 'hybrid', 'person', 'load', 'bathae', 'mathemat', 'incorpor', 'complex', '–', 'sustain', 'solver', 'eh', 'profit', 'ahead', 'l', 'revis', 'ashk', 'showcas', 'elsevi', 'version', 'furthermor', 'price', 'strategi', 'reduct', 'permit', 'control', 'relationship', 'box', 'bathaeekntu', 'august', 'armenia', 'terms—convex', 'nonlinear', 'deficienc', 'slidingwindow', 'close', 'mani', 'heat', 'electr', 'transact', 'flexibl', 'hub', 'quadrat', 'age', 'reliabl', 'unavail', 'function', 'rei', 'dual', 'import', 'outcom', 'abstract—microgrid', 'renew', 'chengi', 'nonconvex', 'forecast', 'licens', 'heavili', 'input', 'singl', 'goal', 'via', 'achiev', 'z', 'constitut', 'research', 'odei', 'financ', 'state', 'mohammad', 'univers', 'cost', 'seek', 'convex', 'juli', 'signific', 'tional', 'mental', 'publish', 'configur', 'realtim', 'homepag', 'assum', 'term', 'case', 'academi', 'e', 'hubei', 'power', 'china', 'bi', 'capac', 'consequ', 'smt', 'h', 'b', 'characterist', 'factor', 'p', 'aris', 'conven', 'astar', 'identifi', 'c', 'due', 'riskconstrain', 'day', 'affect', 'perfectli', 'slot', 'market', 'predict', 'linear', 'novemb', 'plugin', 'corr', 'cvar', 'optim', 'encompass', 'environ', 'increas', 'algorithm', 'addit', 'photovoltaicwind', 'accept', 'eh", 'offlin', 'avail', 'benefici', 'minim', 'infocomm', 'time', 'dei', 'evalu', 'inform', 'june', 'analyz', 'limit', '©', 'see', 'method', 'creat', 'singapor', 'profil', 'aim', 'engin', 'interest', 'homer', 'ab', 'content', 'relat', 'receiv', 'costtogo', 'chargeddischarg', 'zhixin', 'solut', 'curv', 'given', 'tradeoff', 'dispatch', 'current', 'mismatch', 'lacion', 'setup', 'restrict', 'propos', 'carbon', 'drp', 'base', 'arbitrarili', 'deriv', 'issu', 'includ', 'manag', 'obtain', 'manuscript', 'ac', 'final', 'futur', 'level', 'lagrang', 'octob', 'ireland', 'consumpt', 'lagrangian', 'resourc', 'gener', 'colleg', 'ltd', 'oper', 'techniqu', 'model', 'implement', 'order', 'far', 'constant', 'kmean', 'sourc', 'student', 'abil', 'correspond', 'yerevn', 'wt', 'patchabl', 'nomenclatur', 'form', 'vi', 'numer', 'tehran', 'journal', 'rahbar', 'fossil', 'vol', '\x03i', 'discharg', 'main', 'technolog', 'quantifi', 'httpwwwieeorgpublicationsstandardspublicationsrightsindexhtml', 'chines', 'yang', 'demand', 'offset', 'ie', 'wind', 'wu', 'hangzhou', 'tofrom', 'extends', 'essenti', 'object', 'signific', 'inte\xad', 'file', 'integ', 'tsg', 'n', 'effect', 'weather', 'microgrid', 'season', 'grid', 'cell', 'led', 'simultan', 'system', 'realiz', 'condit', 'permiss', 'theori', 'jie', 'econom', 'local', 'digit', 'greatli', 'discuss', 'strike', 'shiyang', 'mechan', 'tive', 'busi', 'data', 'micro', 'practic', 'autom', 'examin', 'determin', 'dongfang', 'uncertain', 'inspir', 'yerevan', 'j', 'thermal', 'smax', 'balanc', 'ai', 'demonstr', 'istribut', 'cd', 'consid', 'noisi', 'differ', 'serv', 'l', 'solar', 'accur', 'utiliza', 'combin', 'date', 'extract', '↑', 'iran', 'onlin', 'apart', 'decreas', 'taghi', 'distribut', 'independ', 'simul', 'nondi', 'dr', 'paper', 'adelaid', 'total', 'administr', 'difficulti', 'invert', 'depart', 'significantli', 'chao', 'natur', 'new', 'subject', 'xuetao', 'peak', 'septemb', 'region', 'howev', 'cluster', 'simula', 'indic', 'bellman', 'appli', 'next', 'author', 'irradi', 'threshold', 'emiss', 'innov', 'timevari', 'reduc', 'g', 'loss', 'toosi', 'speed', 'utc', 'tribut', 'hain', 'gi', 'minimum', 'problem', 'optimum', 'elxjienusedusg', 'perform', 'concept', 'download', 'avail\xad', 'net', 'pro', 'email', 'w', 'valu', 'sophist', 'address', 'coefficient', 'zhejiang', 'horizon', 'key', 'transmiss', 'standalon', 'mold', 'httpdxdoiorgjapenergi', 'problem', 'wwwelseviercomlocateenergi', 'program', 'challeng', 'school', 'compar', 'respect', 'batteri', 'framework', 'reserv', 'studi', 'reli', 'public', 'plant', 'technoeconom', 'elezhangnusedusg', 'devis', 'cough', 'quantiz', 'intermitt', 'institut', 'editor', 'tion', 'index', 'remark', 'zufedfceducn', 'finite', 'ii', 'interact', 'amrollahimhyahoocom', 'unit', 'rui', 'end', 'jointli', 'size', 'correl', 'space', 'drawn', '\x01', 'compani', 'β', 'articl', 'softwar', 'g', 'vehicl', 'fi', 'intric', 'equat', 'assess', 'involv', 'member', 'efficient', 'efficienc', 'smin', 'x', 'associ', 'conduct', 'j', 'begin', 'krahbarnusedusg', 'industri', 'grate', 'output', 'elimin', 'aggreg', 'relev', 'understand', 'random', 'employ', 'present', 'introduc', 'consum', 'variabl', 'risk', 'k', 'histori', 'fcpp', 'stochast', 'avers', 'comput', 'enabl', 'ou', 'vari', 'devot', 'respons', 'smart', 'suppli'}

Cluster: 21, with 5 paper/s had the following terms/topics:

{'could', 'httpcreativecommonsorglicensesbync', 'wwwelseviercomlocateapenergi', 'decemb', 'union', 'energi', 'deeper', 'dergo', 'altern', 'west', 'real', 'number', 'support', 'cpmbsschmmc', 'result', 'state", 'investig', 'f', 'hypothet', 'tip', 'inher', 'togeth', 'improv', 'austria', 'deliv', 'hydrocarbon', 'gridscal', 'crossbord', 'design', 'much', 'markedli', 'rb', 'cannot', 'list', 'particularli', 'countri', 'compon', 'budapest', 'fire', 'ancillari', 'un\xad', 'path', 'manufactur', 'atom', 'without', 'process', 'across', 'to\xad', 'becom', 'constraint', 'nation', 'converts', 'baseload', 'pv', 'approach', 'uncertainiti', 'floor', 'cooper', 'complic', 'januari', 'materi', 'texa', 'pr', 'right', 'charg', 'also', 'mwmi', 'fact', 'find', 'weatherdepend', 'usag', 'variou', 'sensit', 'util', 'stabl', 'preconceiv', 'forc', 'erat', 'enhanc', 'excess', 'configur', 'fuel', 'success', 'homi', 'ieee', 'requir', 'use', 'set', 'six', 'ensu', 'may', 'expect', 'runaway', 'suggest', 'specific', 'lead', 'ca', 'sector', 'croatia', 'brought', 'beyond', 'pose', 'protect', 'petroleum', 'fast', 'capabl', 'blvd', 'conlon', 'stateofcharg', 'scheme', 'r', 'mix', 'network', 'resolut', 'declin', 'expans', 'bync',

'decentr', 'portfolio', 'dahaman', 'applic', 'within', 'modulepriorit', 'storag', 'sciencedirect', 'stabil', 'presenc', 'photovolta', 'ny', 'nearterm', 'ishak', 'chmmc', 'keyword', 'mudd', 'electron', 'infrastructur', 'centr', 'republishationredistribut', 'integr', 'reach', 'explos', 'hybrid', 'person', 'windgener', 'regul', 'load', 'captur', 'disconnect', 'complex', 'imper', 'storm', 'slovenia', 'ward', 'climat', 'forefront', 'voltag', '-', 'sustain', 'systemlevel', 'safeti', 'pelect', 'world', 'select', 'learn', 'curtail', 'im\xad', '*', 'revis', 'consider', 'elsevi', 'penetr', 'angel', 'version', 'measur', 'heliyon', 'europ', 'offshor', 'price', 'strategi', 'extrem', 'reduct', 'permit', 'control', 'must', 'central', 'annual', 'deal', 'academ', 'techno', 'danger', 'electr', 'mani', 'access', 'co', 'flexibl', 'russianukrainian', 'reliabl', 'two', 'dual', 'import', 'paramet', 'ing', 'renew', 'dev', 'kk', 'licens', 'count', 'toler', 'group', 'goal', 'trajectori', 'mean', 'shut', 'achiev', 'via', 'work', 'saf', 'port', 'research', 'mine', 'imbal', 'state', 'nibong', 'behindthemet', 'continu', 'univers', 'cost', 'ashraf', 'analys', 'terenc', 'hungarian', 'signific', 'transit', 'publish', 'nuclear', 'struct', 'homepag', 'modelselect', 'assum', 'analysi', 'term', 'case', 'face', 'veronicagoldsmitharupcom', 'primarili', 'birobencereakbmehu', 'e', 'along', 'tackl', 'deploy', 'lesson', 'zero', 'slovakia', 'power', 'allround', 'disturb', 'winter', 'adopt', 'diurnal', 'rkp', 'capac', 'mwh', 'th', 'h', 'highlight', 'contextu', 'b', 'rupsha', 'postul', 'depend', 'throughout', 'reactor', 'educ', 'longerterm', 'factor', 'p', 'gain', 'conlon*', 'mitiga\xad', 'c', 'interzon', 'due', 'ahmad', 'deep', 'assumpt', 'undergo', 'higher', 'market', 'daylight', 'cover', 'major', 'scale', 'inflex', 'clean', 'tech', 'hertz', 'novemb', 'promis', 'substanti', 'optim', 'costeffect', 'batteriesfuel', 'increas', 'importexport', 'electrolys', 'addit', 'india', 'wait', 'gen\xad', 'frequenc', 'street', 'accept', 'neighbor', 'need', 'ensur', 'michael', 'arup', 'avail', 'decarbon', 'minim', 'vice', 'time', 'evalu', 'inform', 'analyz', 'limit', '©', 'outpac', 'see', 'creat', 'abl', 'cpmdlb', 'interest', 'engin', 'ab', 'prog', 'wise', 'content', 'one', 'water', 'receiv', 'social', 'remain', 'elec\xad', 'put', 'product', 'solut', 'current', 'dispatch', 'phase', 'least', 'note', 'figur', 'carbon', 'propos', 'romania', 'base', 'deriv', 'issu', 'thu', 'includ', 'manag', 'tem', 'realisticallypr', 'make', 'possibl', 'constantli', 'obtain', 'european', 'avoid', 'march', 'wilshir', 'emerg', 'besss', 'fudur', 'profil', 'perceiv', 'level', 'ap', 'rise', 'barc', 'octob', 'bir', 'attract', 'consumpt', 'resourc', 'focu', 'hicl', 'gener', 'scienc', 'ltd', 'wwwsciencedirectcomjournalenergyandclimatechang', 'oper', 'techniqu', 'low', 'lbridg', 'bess', 'coupl', 'model', 'httpsdoiorgjeheliyon', 'rapidli', 'afford', 'implement', 'usa', 'hourli', 'sourc', 'california', 'priorit', 'con', 'correspond', 'onshor', 'slow', 'nomenclatur', 'httpsdoiorgjegycc', 'form', 'break', 'experi', 'shown', 'numer', 'journal', 'mw', 'therefor', 'fossil', 'point', 'm', 'sw', 'min', 'httpsdoiorgjapenergi', 'timestep', 'carriersraw', 'period', 'discharg', 'main', 'r', 'technolog', 'httpwwwieeeorpublicationsstandardspublicationsrightsindexhtml', 'shore', 'role', 'demand', 'sy', 'instead', 'wind', 'fossilbas', 'transmit', 'alongsid', 'realist', 'anticip', 'featur', 'extens', 'energystorag', 'york', 'exist', 'essenti', 'object', 'vijay', 'invest', 'immedi', 'deepli', 'tran', 'would', 'translat', 'cellsmodul', 'effect', 'n', 'asz', 'weather', 'doi', 'microgrid', 'jiashen', 'converg', 'trip', 'grid', 'cell', 'ooi', 'play', 'led', 'variati', 'system', 'hungari', 'buildout', 'take', 'connect', 'condit', 'stop', 'permiss', 'chia', 'volum', 'guarante', 'immens', 'econom', 'digit', 'gw', 'wave', 'batterybas', 'accordingli', 'mechan', 'progress', 'seri', 'data', 'bhanja', 'examin', 'modul', 'opportun', 'sb', 'thermal', 'balanc', 'ai', 'stay', 'demonstr', 'consid', 'match', 'larg', 'ongo', 'overcharg', 'abstract', 'contribut', 'lo', 'pathway', 'v', 'differ', 'l', 'consist', 'neutral', 'tradit', 'rout', 'structur', 'halfbridg', 'aspect', 'solar', 'wwwcellcomheliyon', 'date', 'modi', 'onlin', 'grover', 'supplementari', 'hbridg', 'long', 'sever', 'distribut', 'war', 'simul', 'posit', 'calcul', 'paper', 'modular', 'ramp', 'total', 'columbia', 'event', 'among', 'backup', 'fulli', 'delec', 'otherwis', 'desir', 'ical', 'malaysia', 'depart', 'chemic', 'significantli', 'high', 'qualiti', 'serbia', 'countries', 'mitig', 'natur', 'way', 'teh', 'new', 'russian', 'en\xad', 'strive', 'quickli', 'bani', 'australia', 'mbschmmc', 'build', 'region', 'potenti', 'septemb', 'attila', 'howev', 'safer', 'w', 'veronica', 'similarli', 'durat', 'develop', 'appli', 'bhattacharyya', 'symbol', 'threshold', 'author', 'rr', 'februari', 'selfdischarg', 'monitor', 'establish', 'benefit', 'emiss', 'lesser', 'acceler', 'wileyonlinelibrarycomjournalpr', 'reduc', 'averag', 'drop', 'sbscpmdlb', 'loss', 'tebal', 'minimum', 'opera\xad', 'inequ', 'lifecycl', 'versa', 'uegyetem', 'multilay', 'perform', 'concept', 'intern', 'cater', 'net', 'electrolyt', 'chang', 'trochem', 'parallel', 'enact', 'chiaaiusmmi', 'meet', 'email', 'ideal', 'valu', 'margin', 'even', 'hazard', 'address', 'project', 'specif', 'ctran', 'hydro', 'manner', 'approxim', 'key', 'costoptim', 'environment', 'transmiss', 'supply-', 'degre', 'collabor', 'individu', 'target', 'growth', 'global', 'farm', 'latter', 'challeng', 'cascad', 'satisfactori', 'line', 'school', 'multilevel', 'compar', 'tmccolumbiaedu', 'histor', 'necessari', '•', 'short', 'batteri', 'soc', 'advantag', 'reserv', 'studi', 'piec', 'often', 'public', 'plant', 'adjac', 'fix', 'theoret', 'ergi', 'hydrogen', 'cellpriorit', 'nolog', 'common', 'institut', 'intermitt', 'index', 'tion', 'vre', 'entir', 'rupshabarcgovin', 'interact', 'like', 'run', 'benc', 'unit', 'less', 'uniqu', 'end', 'odi', 'sain', 'singh', 'size', 'free', 'american', 'produc', 'electrif', 'articl', 'mb', 'g', 'share', 'lib', 'vehicl', 'cbatt', 'onofflin', 'identifi', 'assess', 'provid', 'involv', 'member', 'hbni', 'rate', 'secur', 'mission', 'largescal', 'costbenefit', 'begin', 'recent', 'convert', 'industri', 'transport', 'liion', 'hungary',

'output', 'scenario', 'cc', 'account', 'technic', 'look', 'goldsmith', 'open', 'coff', 'introduc', 'loca', 'present', 'stakehold', 'variabl', 'notion', 'bhabha', 'risk', 'k', 'gravit', 'comput', 'capit', 'faculti', 'vari', 'servic', 'respons', 'smart', 'exce', 'green', 'lithiumion', 'suppli', 'april', 'upgrad', 'favor', 'estim', 'har'}

Cluster: 6, with 7 paper/s had the following terms/topics:

{'could', 'explor', 'wwwelseviercomlocateapenergi', 'decemb', 'energi', 'schult', 'expand', 'maximum', 'altern', 'spot', 'real', 'indirectli', 'result', 'plasma', 'f', 'survey', 'recogn', 'improv', 'eger', 'rang', 'climateneutr', 'sinc', 'u', 'germani', 'particularli', 'lohc', 'list', 'countri', 'simon', 'compon', 'scientist', 'automot', 'detail', 'pipe', 'turn', 'directli', 'process', 'rubas', 'ammonia', 'becom', 'similar', 'unpreced', 'gasfir', 'si', 'grimm', 'pv', 'optimis', 'fau', 'mostafaelshafiegmilcom', 'gifu', 'synthes', 'endus', 'januari', 'materi', 'australian', 'knowledg', 'byncnd', 'rais', 'right', 'chennai', 'portat', 'decad', 'also', 'convent', 'head', 'easili', 'pave', 'three', 'wwwsciencedirectcom', 'variou', 'sensit', 'haber', 'util', 'nox', 'tricit', 'weight', 'adequ', 'heavi', 'enhanc', 'over\xad', 'electrolysi', 'sch€', 'unlik', 'govern', 'either', 'fuel', 'requir', 'use', 'hydrogenbas', 'expect', 'moreov', 'proton', 'come', 'turbin', 'lead', 'specific', 'sector', 'well', 'lowcost', 'protect', 'erlangennürnberg', 'ewi', 'sayadi', 'regard', 'r', 'mix', 'kingdom', 'option', 'izat', 'readi', 'facil', 'possi', 'five', 'applic', 'within', 'longdist', 'storg', 'ignit', 'sciencedirect', 'last', 'aftertreat', 'caneon', 'caneonkuriengmailcom', 'keyword', 'link"', 'still', 'chain', 'wellestablish', 'infrastructur', 'tend', 'taken', 'mostafa', 'integr', 'reach', 'find', 'ox', 'httpcreativecommonsorglicensesbi', 'niazmand', 'incorpor', 'modern', 'desalin', 'climat', '—', 'sustain', 'conclud', 'gard', 'oversea', 'world', 'aviat', 'methanol', 'revis', 'consider', 'elsevi', 'furthermor', 'per', 'attent', 'pure', 'price', 'strategi', 'harbor', 'sunshin', 'poten\xad', 'reduct', 'extrem', 'must', 'report', 'catalyst', 'august', 'cologn', 'central', 'awar', 'great', 'mani', 'electr', 'compress', 'access', 'co', 'electrific', 'max', 'gine', 'ment', 'rather', 'import', 'paramet', 'renew', 'gass', 'licens', 'alyt', 'today', 'vector', 'httpsdoiorgjijhyden', 'show', 'view', 'via', 'achiev', 'quir', 'work', 'research', 'diesel', 'matur', 'state', 'en', 'univers', 'massiv', 'cost', 'analys', 'autoignit', 'juli', 'leav', 'transit', 'dedic', 'today"', 'publish', 'road', 'countrylevel', 'homepag', 'michaelmoritzewiunikoelnd', 'assum', 'concern', 're', 'kerosen', 'analysi', 'moritz', 'term', 'case', 'face', 'economi', 'onfisch', 'transform', 'might', 'amount', 'e', 'zero', 'treat', 'power', 'trade', 'molecul', 'capac', 'mwh', 'comparison', 'h', 'b', 'characterist', 'depend', 'mediocr', 'factor', 'p', 'gain', 'c', 'mainli', 'due', 'affect', 'costliest', 'windsolar', "'ship', 'higher', 'kurien', 'cover', 'air', 'scale', 'novemb', 'clean', 'optim', 'costeffect', 'oie', 'moder', 'blue', 'carbonfre', 'increas', 'georg', 'addit', 'destin', 'india', 'coal', 'accept', 'need', 'ensur', 'michael', 'comprehens', 'avail', 'decarbon', 'minim', 'time', 'evalu', 'analyz', 'limit', '©', 'supercharg', 'method', 'creat', 'nadu', 'japan', 'temperatur', 'gaseou', 'aim', 'interest', 'pipelin', 'engin', 'homer', 'content', 'relat', 'one', 'novel', 'iranian', 'water', 'receiv', 'veronika', 'social', 'remain', 'elec\xad', 'gasolin', 'product', 'nürnberg', 'current', 'note', 'nitrogen', 'carbon', 'propos', 'radiat', 'berlin', 'base', 'deriv', 'issu', 'marchstr', 'includ', 'modific', 'ga', 'make', 'obtain', 'possibl', 'european', 'behbahaninia', 'march', 'final', 'herein', 'electrolyz', 'futur', 'platform', 'cation', 'level', 'blend', 'rise', 'necessarili', 'step', 'oil', 'attract', 'octob', 'consumpt', 'resourc', 'briefli', 'gener', 'domest', 'ltd', 'cat', 'oper', 'ingli', 'low', 'better', 'techniqu', 'model', 'usdtnh', 'suffer', 'truck', 'germany"', 'paneuropean', 'implement', 'commod', 'export', 'sourc', 'exempl', 'correspond', 'woodstock', 'lh', 'vision', 'liquid', 'marin', 'bright', 'endogen', 'jona', 'form', 'experi', 'nearest', 'vogelsang', 'numer', 'caus', 'tehran', 'journal', 'therefor', 'fossil', 'duction', 'friedrichalexanderuniversit"', 'httpsdoiorgjapenergi', 'overarch', 'locat', 'start', 'wide', 'highest', 'plan', 'technolog', 'veronikagrimmfaud', 'quantifi', 'role', 'demand', 'carrier', 'divis', 'effort', 'wind', 'strong', 'densiti', 'replac', 'exist', 'databas', 'madra', 'signific', 'invest', 'immedi', 'repurpos', 'tran', 'inland', 'south', 'worldwid', 'n', 'effect', 'ncnd', 'tial', 'importdepend', 'cell', 'grid', 'citi', 'benefit', 'jonasegererfaud', 'pa', 'system', 'hardtoab', 'clear', 'condit', 'crack', 'toward', 'theori', 'kakavand', 'econom', 'local', 'discuss', 'mechan', 'data', 'littl', 'practic', 'opportun', 'determin', 'unburn', 'j', 'decarbon\xad', 'maritim', 'fromto', 'follow', 'consid', 'larg', 'spark', 'contribut', 'lo', 'differ', 'v', 'cheapest', 'ssayadituberlind', 'haberbosch', 'pathway', 'kiana', 'seawat', 'l', 'rapid', 'neutral', 'viabl', 'countryspecific', 'rout', 'fa', 'aspect', 'ship', 'enough', 'solar', 'especi', 'separ', 'combin', 'prospect', 'arguabl', 'organ', 'onlin', 'iran', 'ratio', 'flammabl', 'fourth', 'distribut', 'norway', 'supplier', 'universit€', 'simul', 'calcul', 'paper', 'candid', 'total', 'among', 'catalyt', 'rung', 'exchang', 'depart', 'haber–bosch', 'high', 'qualiti', 'wwwelseviercomlocateh', 'mitig', 'natur', 'new', 'australia', 'septemb', 'potenti', 'region', 'geograph', 'howev', 'indic', 'pariti', 'develop', 'appli', 'biliti', 'next', 'author', 'paid', 'establish', 'emiss', 'suitabl', 'lang', 'fundament', 'increas\xad', 'reduc', 'averag', 'spain', 'usdkgh', 'technisch', 'elshafi', 'toosi', 'speed', 'alreadi', 'minimum', 'combust', 'chosen', 'perform', 'intern', 'net', 'chang', 'mayank', 'pro', 'email', 'membran', 'valu', 'sea', "'clean', 'electrochem', 'even', 'fuell', 'address', 'project', 'made', 'gray', 'key', 'environment', 'target', 'domin', 'global', 'cryogen', 'challeng', 'compar', 'depth', '•', 'respect', 'short', 'llc', 'costeffici', 'tsatsaroni', 'chair', 'context',

'studi', 'get', 'reserv', 'public', 'scarciti', 'plant', 'zeroemiss', 'indian', 'deliveri', 'ergi', 'concentr', 'technoeconom', 'flame', 'hydrogen', 'review', 'bosch', 'focus', 'institut', 'synthesi', 'action', 'like', 'link', 'composit', 'sent', 'perspect', 'allow', 'unit', 'oxford', 'philippungefaud', 'mittal', 'direct', 'produc', '\x01', 'articl', 'tamil', 'forese', 'shinji', 'g', 'haberebosch', 'literatur', 'vehicl', 'saeed', 'carbonneutr', 'decarbonis', 'assess', 'provid', 'alon', 'advanc', 'efficienc', 'kiananiazmandfaud', 'rate', 'detriment', 'associ', 'conduct', 'str', 'largescal', 'methan', 'mmittaliitmacin', 'recent', 'industri', 'second', 'transport', 'recommend', 'nh', 'scenario', 'cc', 'strengthen', 'lower', 'technic', 'choos', 'ali', 'competit', 'open', 'understand', 'roadmap', 'twothird', 'whose', 'introduc', 'present', 'distanc', 'normal', 'lack', 'duce', 'philipp', 'k', 'histori', 'markup', 'capit', 'enabl', 'kambara', 'faculti', 'site', 'first', 'green', 'suppli', 'april', 'liquefi', 'estim', 'roadblock'}

Cluster: 2, with 2 paper/s had the following terms/topics:

{'explor', 'tiviti', 'wwwelseviercomlocateapenergi', 'vsm', 'energi', 'coller', 'maximum', 'lessen', 'altern', 'fossilfuel', 'dioxid', 'result', 'investig', 'fit', 'f', 'notabl', 'kuznet', 'gridscal', 'design', 'sinc', 'much', 'field', 'list', 'coefficient', 'complianc', 'compon', 'fire', 'detail', 'fre', 'becom', 'similar', 'unprec', 'brunt', 'nation', 'ibr', 'approach', 'equilibrium', 'econometr', 'code', 'xplore', 'empir', 'right', 'also', 'confer', 'convent', 'three', 'find', 'usag', 'greenhous', 'sensit', 'threat', 'govern', 'construct', 'fuel', 'ieee', 'use', 'moreov', 'lesedimasisiwitsacza', 'minnaar', 'cointegr', 'protect', 'capabl', 'ds', 'forest', 'scheme', 'mix', 'r', 'network', 'ekc', 'ardl', 'facil', 'fault', 'dynam', 'senyan', 'fbekungelisimedutr', 'storag', 'descript', 'sciencedirect', 'stabil', 'keyword', 'saupec', 'integr', 'hybrid', 'adjust', 'load', 'reveal', 'disconnect', 'imper', 'climat', 'categori', 'voltag', 'sustain', 'world', 'revis', 'elsevi', 'furthermor', 'relay', 'reduct', 'control', 'ciat', 'relationship', 'annual', 'remot', 'benchmark', 'electr', 'co', 'bear', 'function', 'two', 'import', 'gelisim', 'renew', 'sang', 'pri\xad', 'licens', 'year', 'goal', 'mean', 'alsokhiri', 'view', 'achiev', 'work', 'univers', 'despit', 'carbonreduct', 'transit', 'signific', 'mental', 'perman', 'homepag', 'confirm', 'analysi', 'face', 'case', 'scr', 'circuit', 'ts', 'e', 'alter', 'bound', 'deploy', 'dy\xad', 'victor', 'power', 'disturb', 'adopt', 'johannesburg', 'emtbas', 'mwh', 'comparison', 'h', 'highlight', 'afrika', 'b', 'terms—grid', 'c', 'vsg', 'et', 'van', 'undergo', 'air', 'major', 'novemb', 'scale', 'attribut', 'tech', 'increas', 'addit', 'frequenc', 'accept', 'classifi', 'need', 'comprehens', 'avail', 'june', 'evalu', 'inform', 'carbonincom', 'limit', '©', 'method', 'flood', 'abl', 'test', 'engin', 'ab', 'content', 'receiv', 'social', 'contributor', 'agricultur', 'race', 'curv', 'tradeoff', 'restrict', 'carbon', 'african', 'base', 'turkey', 'longterm', 'issu', 'lesedi', 'includ', 'ga', 'longrun', 'dampen', 'activ', 'gridform', 'level', 'reactiv', 'rise', 'vsc', 'octob', 'consumpt', 'influenc', 'resourc', 'focu', 'gener', 'polici', 'scienc', 'autoregress', 'ltd', 'oper', 'techniqu', 'bess', 'model', 'boden', 'root', 'impact', 'implement', 'order', 'stress', 'i', 'constant', 'million', 'quenc', 'sourc', 'southern', 'priorit', 'correspond', 'utilis', 'beirut', 'form', 'weak', 'numer', 'bad', 'journal', 'mw', 'fossil', 'point', 'nomic', 'httpsdoiorgjapenergi', 'matlabsimulinksimschap', 'lag', 'technolog', 'quantifi', 'adebayo', 'role', 'wind', 'phenomenon', 'compliant', 'stud', 'lebanes', 'object', 'eco\xad', 'cleaner', 'south', 'packag', 'worldwid', 'n', 'effect', 'doi', 'trip', 'grid', 'nexu', 'play', 'electromagnet', 'simultan', 'led', 'virtual', 'pursu', 'system', 'condit', 'take', 'connect', 'xr', 'death', 'seven', 'conting', 'econom', 'local', 'accordingli', 'part', 'busi', 'data', 'practic', 'defin', 'determin', 'pertain', 'john', 'undertaken', 'demonstr', 'follow', 'consid', 'name', 'contribut', 'environ\xad', 'masisi', 'phasor', 'differ', 'serv', 'na\xad', 'conclus', 'l', 'neutral', 'besf', 'solar', 'outlin', 'deforest', 'primari', 'sdg', 'adnan', 'witwatersrand', 'onlin', 'ratio', 'human', 'distribut', 'gridintegr', 'simul', 'posit', 'adelaid', 'administr', 'among', 'backup', 'invert', 'escal', 'al', 'exchang', 'depart', 'qualiti', 'ac\xad', 'mitig', 'landus', 'devast', 'howev', 'indic', 'robust', 'abstract—thi', 'evid', 'transient', 'rm', 'develop', 'appli', 'author', 'emiss', 'innov', 'tigat', 'utc', 'disast', 'alreadi', 'nearli', 'combust', 'download', 'squar', 'perform', 'intern', 'chang', 'kassar', 'droop', 'pro', 'namic', 'email', 'procedur', 'pesaran', 'address', 'project', 'environment', 'transmiss', 'domin', 'growth', 'bekun', 'global', 'farm', 'challeng', 'shall', 'school', 'line', 'pilot', 'inv', '•', 'short', 'respect', 'standard', 'batteri', 'reserv', 'studi', 'context', 'plant', 'modifi', 'tection', 'prematur', 'ridethrough', 'review', 'tso', 'nolog', 'common', 'ac', 'intermitt', 'pollut', 'tion', 'index', 'action', 'ii', 'document', 'like', 'karabosenyanegmailcom', 'unit', 'unsdg', 'creasingli', 'istanbul', 'end', 'meant', 'nd', 'asso', 'american', 'profound', 'marili', 'conse\xad', 'synchron', 'softwar', 'tool', 'g', 'karabo', 'literatur', 'lebanon', 'provid', 'assess', 'hvdc', 'synchronvert', 'rate', 'associ', 'conduct', 'largescal', 'festu', 'convert', 'inertia', 'industri', 'quenci', 'output', 'repres', 'advers', 'relev', 'harmon', 'employ', 'introduc', 'present', 'leverag', 'stakehold', 'variabl', 'newlybuilt', 'histori', 'johnvancollerwitsacza', 'faculti', 'respons', 'vilmann', 'surg', 'green', 'matlabsimulink', 'machin', 'estim'}

Cluster: 13, with 8 paper/s had the following terms/topics:

{'could', 'decemb', 'tiviti', 'slowli', 'leakag', 'energi', 'baselin', 'associ\xad', 'commit', 'northern', 'altern', 'fossilfuel', 'dioxid', 'coat', 'support', 'sa', 'result', 'ccu', 'ikramuniten', 'polydopamin', 'fit', 'britain', 'investig', 'f',

'improv', 'offer', 'wwwelseviercomlocaters', 'austria', 'rang', 'anaerob', 'design', 'u', 'sinc', 'cannot', 'germani',
'list', 'particularli', 'ordinari', 'countri', 'ph', 'nsw', 'wounds-', 'introduc', 'excel', 'manufactur', 'turn', 'wastewat',
'directli', 'imperi', 'airbas', 'process', 'disadvantag', 'wwwelseviercomlocatepec', 'across', 'ammonia', 'termin',
'cgen', 'becom', 'owe', 'constraint', 'origin', 'eqkg', 'almost', 'nation', 'syirat', 'pv', 'optimis', 'bs', 'dustrial', 'motiv',
'pari', 'cf', 'cop', 'code', 'earth', 'synthes', 'timevansriotintocom', 'wound', 'complet', 'januari', 'shift', 'materi',
'civilian', 'agar', 'complic', 'nanowir', 'rais', 'decad', 'right', 'bmg', 'confer', 'also', 'microstructur', 'heatwav',
'agathokl', 'convent', 'quantiti', 'maiti', 'feedstock', 'invas', 'shreenag', 'fact', 'three', 'keep',
'wwwsciencedirectcom', 'greenhous', 'variou', 'tob', 'sensit', 'metalfre', 'util', 'life', 'threat', 'hydrogel', 'enhanc',
'photocatalyst', 'electrolysi', 'excess', 'driven', 'qut', 'kyoto', 'digest', 'unlik', 'govern', 'either', 'pandey',
'construct', 'outperform', 'fuel', 'success', 'pox', 'requir', 'use', 'set', 'impli\xad', 'overall', 'gwp', 'nw', 'closur',
'may', 'cool', 'expect', 'calcutta', 'colour', 'moreov', 'proton', 'p', 'come', 'behalf', 'coli', 'sector', 'beyond', 'well',
'pivot', 'muditha', 'protect', 'capabl', 'powertoga', 'induc', 'compris', 'nevertheless', 'rio', 'zainal', 'destruct',
'con\xad', 'r', 'network', 'option', 'aem', 'us', 'resolut', 'place', 'herrando', 'declin', 'handl', 'readi', 'exacerb',
'obviou', 'facil', 'aureu', 'sm', 'biofuel', 'photo', 'ppypda', 'effici', 'portfolio', 'dynam', 'applic', 'found', 'fluid',
'within', 'iev', 'militari', 'storg', 'background', 'cmarkidesimperialacuk', 'sciencedirect', 'last', 'stabil', 'inject',
'ex', 'presenc', 'photovolta', 'keyword', 'ad', 'polypyrrol', 'still', 'summar', 'seriou', 'gasif', 'strezov', 'infrastructur',
'properti', 'centr', 'integr', 'jaya', 'evan', 'hybrid', 'birmingham', 'rv', 'spectral', 'regul',
'httpcreativecommonsorglicensesbi', 'faster', 'incorpor', 'scalabl', 'substanc', 'stack', 'captur', 'windpow',
'complex', 'desalin', 'refriger', 'sign', 'climat', 'sustain', '-', 'safeti', 'select', 'existenti', 'learn', 'curtail',
'human\xad', 'solid', 'revis', 'bv', 'methanol', '°c', 'heatpip', 'asset', 'elsevi', 'ondemand', 'furthermor', 'flexibl',
'dk', 'huang', 'attent', 'robert', 'ekinsdauk', 'regen', 'strategi', 'reduct', 'campu', 'anion', 'wherea', 'control',
'extrem', 'report', 'coral', 'catalyst', 'august', 'awar', 'academ', 'abeysekera', 'deal', 'great', 'close', 'electr', 'heat',
'mani', 'compress', 'ned', 'access', 'solargener', 'remap', 'co', 'flexibl', 'interestingli', 'epiderm', 'dual', 'import',
'quatern', 'renew', 'air-wat', 'treatment', 'licens', 'year', 'singl', 'group', 'stateofheart', 'httpsdoiorgjijhyden',
'show', 'goal', 'vivo', 'smr', 'substitut', 'achiev', 'via', 'research', 'matur', 'state', 'continu', 'petal', 'wien', 'en',
'univers', 'photovoltaictherm', 'tel', 'imr', 'cost', 'worst', 'lowcarbon', 'despit', 'meysam', 'analys', 'juli', 'ef\xad',
'vicin', 'headroom', 'mental', 'transit', 'signific', 'sepsi', 'publish', 'road', 'dkmchemicalunivacin', 'releas',
'homepag', 'mere', 'confirm', 'earlier', 'analysi', 'moham', 'compli', 'face', 'case', 'domain', 'economi',
'pvelectrolyz', 'nano', 'tu', 'warm', 'lowemiss', 'drive', 'might', 'transform', 'e', 'commercialis', 'deploy', 'zero',
'vascular', 'prove', 'experiment', 'delic', 'treat', 'aditi', 'soteri', 'power', 'gb', 'china', 'typic', 'necessit', 'indra',
'adopt', 'biddatulunitenedumi', 'world', 'cross', 'painfect', 'capac', 'drawback', 'httpsdoiorgacsnanoc', 'hh', 'h',
's-chp', 'highlight', 'b', 'depend', 'reform', 'httpsdoiorgjpec', 'meda', 'area', 'factor', 'p', 'gain', 'identifi', 'c', 'due',
'mainli', 'day', 'affect', 'cypru', 'higher', 'market', 'wildfir', 'cover', 'major', 'novemb', 'promis', 'clean', 'absorb',
'tech', 'realis', 'substanti', 'environ', 'encompass', 'split', 'blue', 'increas', 'soughtaft', 'electrolys', 'india', 'burn',
'modif', 'coal', 'basi', 'accept', 'ong', 'haa', 'hyunah', 'classifi', 'need', 'good', 'reaction', 'ensur', 'mahlia', 'refin',
'selfsustain', 'comprehens', 'avail', 'decarbon', 'therebi', 'deplet', 'fc', 'whole', 'copyright', 'time', 'commerci',
'evalu', 'inform', 'june', 'analyz', 'limit', '©', 'ajanoviceegtuwienacat', 'nir', 'univ', 'see', 'yashesh', 'method',
'assist', 'clinic', 'flood', 'inactiv', 'temperatur', 'london', 'soec', 'gaseou', 'harm', 'macquari',
'hannahyunahchohdrmqeduaui', 'infra\xad', 'interest', 'engin', 'kai', 'ab', 'aim', 'pipelin', 'kalogir', 'content',
'one', 'nearinfrar', 'water', 'receiv', 'lyzer', 'cg', 'contributor', 'remain', 'collagen', 'bidattul', 'product', 'solut',
'curv', 'given', 'ronment', 'ashrafur', 'rahman', 'rajyaguru', 'current', 'least', 'arduou', 'civil', 'carbon', 'chitosan',
'escherichia', 'base', 'licensesbi', 'jenkin', 'longterm', 'summaris', 'enrich', 'ding', 'thu', 'includ', 'manag',
'collector', 'ga', 'extern', 'bandar', 'aranya', 'make', 'possibl', 'urgent', 'avoid', 'thcenturi', 'march', 'final', 'henc',
'biomed', 'herein', 'activ', 'futur', 'electrolyz', 'jianzhong', 'electro', 'everincreas', 'landscap', 'question', 'level',
'cation', 'mostli', 'fig', 'rise', 'emit', 'laboratori', 'poulami', 'aminoglycosid', 'octob', 'attract', 'step', 'consumpt',
'electrocatalyst', 'stantial', 'resourc', 'uptak', 'briefli', 'oil', 'repair', 'focu', 'gener', 'scienc', 'colleg', 'ltd', 'domest',
'polici', 'oper', 'low', 'eq', 'sixfold', 'scope', 'coupl', 'model', 'scwg', 'grow', 'rapidli', 'abbrevi', 'ren', 'impact',
'implement', 'order', 'accord', 'million', 'plate', 'preindustri', 'usa', 'parti', 'sourc', 'cycl', 'abil', 'centuri',
'correspond', 'atr', 'emphasis', 'supercrit', 'four', 'onshor', 'slow', 'lengthi', 'legitim', 'utilis', 'kensington',
'importantli', 'ker', 'form', 'nanofluid', 'experi', 'ate', 'color', 'diffus', 'hwai', 'nghiem', 'agre', 'numer', 'tissu',
'caus', 'httpdxdoiorgjijhyden', 'endow', 'journal', 'therefor', 'wale', 'fossil', 'chyuan', 'gramneg', 'sw', 'rare',
'limassol', 'suscept', 'cope', 'wide', 'sydney', 'az', 'driver', 'health', 'main', 'plan', 'technolog', 'highest', 's-cchp',
'nasion', 'role', 'demand', 'carrier', 'effort', 'mt', 'wind', 'wu', 'strong', 'yulong', 'boost', 'societi', 'compat',

'anticip', 'hangzhou', 'urn', 'replac', 'taylor', 'tenaga', 'tonn', 'exist', 'ach\xad', 'essenti', 'microbi', 'sun', 'object', 'signific', 'envi\xad', 'vijay', 'immedi', 'islammdrizwanulfattahutseduau', 'wit', 'south', 'worldwid', 'selangor', 'n', 'effect', 'steel', 'array', 'cell', 'grid', 'acid', 'ia', 'benefit', 'play', 'pvelec', 'bioga', 'pa', 'dri', 'system', 'truli', 'reef', 'cho', 'esmr', 'bacteria', 'abus', 'condit', 'take', 'crucial', 'volum', 'toward', 'injuri', 'nick', 'econom', 'electrifi', 'gw', 'discuss', 'implic', 'mechan', 'part', 'progress', 'seri', '-', 'data', 'practic', 'bois', 'ptg', 'opportun', 'examin', 'determin', 'jalan', 'j', 'markid', 'thermal', 'balanc', 'metal', 'demonstr', 'follow', 'antioxid', 'zaragoza', 'consid', 'larg', 'difficult', 'od', 'contribut', 'kg', 'eg', 'uk', 'pathway', 'legallybind', 'differ', 'cheapest', 'protocol', 'v', 'staphylococcu', 'conclus', 'l', 'ambiti', 'divers', 'wang', 'highli', 'minor', 'electrocatalyt', 'structur', 'todd', 'queen', 'antimicrobi', 'advan\xad', 'solar', 'especi', 'instal', 'combin', 'metalbas', 'primari', 'date', 'steam', 'sub', 'onlin', 'decreas', 'long', 'fourth', 'although', 'istenc', 'sever', 'ficienc', 'bd', 'fattah', 'in\xad', 'act', 'wwwelseviercomlocatesusmat', 'human', 'distribut', 'impress', 'posit', 'grey', 'antibacteri', 'paper', 'liquidbas', 'candid', 'vladimir', 'adelaid', 'total', 'among', 'aeruginosa', 'benign', 'fulli', 'catalyt', 'desir', 'kajang', 'exchang', 'deposit', 'httpspubsacsorgsharingguidelin', 'malaysia', 'depart', 'chemic', 'significantli', 'qualiti', 'high', 'otanicar', 'wwwelseviercomlocateh', 'pin', 'ac\xad', 'tegaderm', 'hurd', 'mitig', 'serious', 'natur', 'overview', 'way', 'neovascular', 'new', 'bani', 'clarifi', 'tobramycin', 'job', 'australia', 'qadrdan', 'build', 'potenti', 'region', 'provinc', 'septemb', 'howev', 'httpsdoiorgjrser', 'preval', 'inflamm', 'other', 'bactericid', 'develop', 'evolut', 'author', 'irradi', 'tage', 'februari', 'mousa', 'record', 'epitheli', 'establish', 'emiss', 'innov', 'suitabl', 'kind', 'fundament', 'reduc', 'averag', 'spain', 'spotlight', 'loss', 'utc', 'garner', 'jern', 'ajanov', 'osama', 'drugresist', 'minimum', 'combust', 'overcom', 'nonrenew', 'subsequ', 'sunway', 'problem', 'download', 'perform', 'concept', 'courag', 'intern', 'wwwacs.nanoorg', 'net', 'chang', 'email', 'meet', 'eu', 'yet', 'membran', 'pvpower', 'ideal', 'valu', 'sea', 'previou', 'margin', 'even', 'pseudomona', 'address', 'project', 'specif', 'maría', 'zhejiang', 'tempera\xad', 'hydro', 'sr', 'queensland', 'key', 'approxim', 'cn', 'environment', 'anoth', 'transmiss', 'vladimirstrezovmqeduau', 'prioriti', 'selfheal', 'promot', 'target', 'qcsodtobppypda', 'cardiff', 'growth', 'ghg', 'global', 'cryogen', 'challeng', 'evolu', 'best', 'school', 'compil', 'tj', 'da', 'compar', 'longlast', 'short', 'llc', 'bacterialinfect', 'vigor', 'framework', 'agreement', 'advantag', 'dilip', 'context', 'studi', 'reserv', 'tri', 'public', 'reli', 'qc', 'popul', 'overpotenti', 'bacteri', 'demandsid', 'deliveri', 'concentr', 'latest', 'light', 'trap', 'hydrogen', 'review', 'nolog', 'hannah', 'whether', 'fraction', 'common', 'ac', 'institut', 'drought', 'pollut', 'partial', 'tion', 'entir', 'heal', 'action', 'wider', 'like', 'auto', 'link', 'photocatalyt', 'pt', 'takeaway', 'allow', 'christo', 'unit', 'uniqu', 'feed', 'chaudri', 'lca', 'chemistri', 'qld', 'prevent', 'american', 'produc', 'prepar', '\x01', 'replenish', 'nextgener', 'pem', 'kolkata', 'dextran', 'articl', 'lifethreaten', 'chalcogenid', 'antibiot', 'brisban', 'hota', 'pvt', 'g', 'share', 'abund', 'literatur', 'vehicl', 'identifi', 'provid', 'karlsruhe', 'assess', 'alon', 'ujwalshreenagmrvcceeduin', 'un', 'involv', 'advanc', 'efficient', 'qadrdanmcardiffacuk', 'efficienc', 'rafaela', 'bengaluru', 'pressur', 'inexhaust', 'vital', 'associ', 'welec', 'cap\xad', 'conduct', 'secur', 'possess', 'kill', 'methan', 'recent', 'convert', 'httpcreativecommonsorg', 'industri', 'ture', 'hassan', 'tim', 'transport', 'recommend', 'vulner', 'sumption', 'cc', 'thorough', 'oxid', 'lower', 'account', 'technic', 'parad', 'competit', 'open', 'understand', 'critic', 'introduc', 'employ', 'present', 'full', 'wast', 'schiff', 'k', 'histori', 'succinctli', 'comput', 'enabl', 'infect', 'dress', 'conserv', 'aa', 'semiconductor', 'vienna', 'faculti', 'trauma', 'modassar', 'mixtur', 'respons', 'smart', 'gan', 'first', 'surg', 'cep', 'green', 'bgreform', 'suppli', 'april', 'frequent', 'sayer', 'biomass', 'barrier', 'ujwal', 'estim', 'httpsdoiorgjsusm', 'scrutinis', 'type}

Cluster: 12, with 3 paper/s had the following terms/topics:

{'ti', 'multielectronprotoninvolv', 'shengjun', 'energi', 'zhang', 'nonetheless', 'maximum', 'altern', 'li', 'number', 'assembl', 'support', 'q', 'result', 'sufficient', 'small', 'yan'an', 'sociat', 'investig', 'improv', 'f', 'rang', 'design', 'systemat', 'sinc', 'list', 'process-', 'compon', 'h-', 'detail', 'introduc', 'scientists', 'luo', 'manufactur', 'atom', 'directli', 'came', 'without', 'process', 'ammonia', 'convers', 'po', 'flcorrespond', 'materi', 'xpsunsdnueducn', 'yadxufengcom', 'nanowir', 'pr', 'right', 'also', 'easili', 'usag', 'variou', 'xun', 'haber', 'util', 'stabl', 'life', 'znno', 'enhanc', 'frontier', 'photocatalyst', 'electrolysi', 'king', 'fe', 'liu', 'construct', 'fuel', 'ultrathin', 'electrosynthesi', 'use', 'requir', 'known', 'salt', 'popular', 'exploit', 'di', 'may', 'moreov', 'proton', 'haberbosch', 'thermodynam', 'zhengwei', 'lead', 'sector', 'well', 'alshehri', 'qingdao', 'fu', 'nevertheless', 'regard', 'r', 'httpsdoiorgsml', 'wwwsmalljournalcom', 'easier', 'effici', 'applic', 'decis', 'found', 'militari', 'storag', 'sciencedirect', 'bian', 'nn', 'energyintens', 'keyword', 'still', 'storabl', 'electron', 'poor', 'footprint', 'reach', 'find', 'httpsdoiorgjapcatb', 'soar', 'intrins', 'regul', 'reveal', 'faster', 'ying', 'stock', 'format', 'refriger', '-', 'sustain', 'conclud', 'environmentfriendli', 'world', 'select', 'learn', 'bv', 'revis', 'mn', '°c', 'elsevi', 'gongfengseueducn', 'furthermor', 'matter', 'zheng', 'sure', 'strategi', 'reduct', 'deoxygen', 'chunm', 'control', 'report', 'catalyst', 'box', 'tang', 'deal', 'etc', 'great', 'binwu', 'readili', 'co', 'tingshuai', 'guo', 'mol-', 'dissoci', 'nice', 'electrod', 'ment', 'function', 'reliabl', 'two', 'dual', 'import',

'ing', 'renew', 'treatment', 'zhou', 'ntonh', 'substitut', 'group', 'today', 'shut', 'show', 'via', 'z', 'research', 'phosphatebuff', 'taoxia', 'univers', 'mo', 'appeal', 'detect', 'signific', 'transit', 'releas', 'yin', 'homepag', 'assum', 'jing', 'nanj', 'devel\xad', 'sml', 'economy', 'encourag', 'wo', 'amount', 'e', 'people', 'deploy', 'arabia', 'stream', 'experiment', 'yuji', 'valuabl', 'power', 'china', 'bi', 'adopt', 'ocean', 'h', 'highlight', 'higheffici', 'b', 'reform', 'reactor', 'educ', 'c', 'due', 'liang', 'behaviorskinet', 'fabric', 'higher', 'cai', 'hbase', 'scale', 'promis', 'cowork', 'clean', 'ev', 'kj', 'environ', 'optim', 'laoshan', 'split', 'task', 'addit', 'pilotscale', 'huzhou', 'coal', 'basi', 'accept', 'highpur', 'fuelbas', 'good', 'reaction', 'sig', 'avail', 'decarbon', 'time', 'june', 'commerci', 'analyz', 'limit', '©', 'highrat', 'adsorptionactiv', 'method', 'creat', 'temperatur', 'safe', 'perfect', 'tio', 'interest', 'engin', 'yan', 'µg', 'content', 'alternative-', 'water', 'receiv', 'intens', 'remain', 'fan', 'product', 'yinyuan', 'zixiao', 'current', 'tradeoff', 'phase', 'nitrogen', 'propos', 'carbon', 'defect', 'mode', 'carbonemit', 'thu', 'sichuan', 'includ', 'ga', 'principl', 'make', 'obtain', 'besid', 'crisi', 'herein', 'qian', 'activ', 'futur', 'fertil', 'landscap', 'level', 'emit', 'laboratori', 'selfreconstruct', 'octob', 'attract', 'step', 'electrocatalyst', 'resourc', 'ministri', 'coordin', 'gener', 'scienc', 'colleg', 'gradual', 'unsustain', 'ltd', 'puriti', 'low', 'model', 'suffer', 'guolicom', 'accord', 'far', 'million', 'plate', 'hold', 'wwwelseviercomlocateapcatb', 'sourc', 'httpsdoiorgjmattd', 'correspond', 'unsatur', 'nanoarray', 'liquid', 'xiaoya', 'surfac', 'form', 'break', 'exper', 'numer', 'caus', 'xupe', 'journal', 'therefor', 'mw', 'fossil', 'nitric', 'wide', '-n', 'µmol·g⁻¹·h⁻¹', 'technolog', 'hydrogena', 'yang', 'role', 'demand', 'carrier', 'instead', 'ambient', 'densiti', 'jun', 'extraordinarili', 'oxygendefect', 'zn', 'extens', 'tio-xtp', 'energysav', 'sun', 'object', 'medicin', 'translat', 'ruqi', 'worldwid', 'n', 'effect', 'doi', 'element', 'adsorpt', 'behav', 'unravel', 'cell', 'acid', 'xpsunuestceducn', 'play', 'system', 'truli', 'expo\xad', 'condit', 'take', 'crucial', 'rich', 'volum', 'toward', 'theori', 'jie', 'greatli', 'fixat', 'accordingli', 'mechan', 'cirtic', 'genuin', 'practic', 'opportun', 'bond', 'j', 'highperform', 'thermal', 'lyst', 'metal', 'steelmak', 'vacanc', 'bo', 'larg', 'catalysi', 'eg', 'haberbosch', 'serv', 'seawat', 'l', 'ambiti', 'wang', 'neutral', 'tio-x', 'electrocatalyt', 'rout', 'structur', 'impur', 'solar', 'primari', 'ignor', 'prospect', 'metric', 'condens', 'powertox', 'xiong', 'organ', 'onlin', 'ecolog', 'cm-', 'ftir', 'although', 'hospit', 'abdulmohsen', 'cata', 'unfortun', 'calcul', 'lab', 'catalyt', 'depart', 'chemic', 'identif', 'qualiti', 'high', 'call', 'dope', 'natur', 'way', 'new', 'peak', 'halid', 'center', 'howev', 'robust', 'evid', 'develop', 'appli', 'bimoo', 'evolut', 'author', 'nonpolar', 'easi', 'benefit', 'feng', 'suitabl', 'fundament', 'oxygen', 'du', 'unrealist', 'synthet', 'cobimoo', 'n-', 'shortcom\xad', 'combust', 'encount', 'affili', 'hong', 'pnrr', 'yuanyuan', 'perform', 'insitu', 'electrolyt', 'ton', 'email', 'membran', 'ideal', 'electrochem', 'address', 'zhejiang', 'key', 'approxim', 'abdulaziz', 'environment', 'nific', 'exhibit', 'domin', 'global', 'challeng', 'school', 'compar', 'batteri', 'advantag', 'farada', 'reserv', 'studi', 'popul', 'leum', 'plant', 'gmbh', 'saudi', 'latest', 'concentr', 'hydrogen', 'yongsong', 'review', 'tangbsdnueducn', 'whether', 'bosch', 'institut', 'synthesi', 'tion', 'emphas', 'half', 'petro', 'like', 'chengdu', 'photocatalyt', 'perspect', 'zhao', 'wangdjcom', 'rui', 'feed', 'arous', 'wileyvch', 'longcheng', 'chemistri', 'yinyuanzhengsinacom', 'abñ', 'damag', 'direct', 'produc', 'mpa', '\x01', 'jiangsu', 'interdisciplinari', 'edg', 'sourcebas', 'gong', 'articl', 'bdñ', 'carbonneutr', 'jinan', 'southeast', 'provid', 'obstac', 'advanc', 'n\ue0ccn', 'rate', 'pressur', 'inexhaust', 'x', 'lff', 'conduct', 'refin', 'aqueou', 'recent', 'industri', 'transport', 'nh', 'strengthen', 'repres', 'oxid', 'jeddah', 'dft', 'look', 'ali', 'competit', 'introduc', 'quest', 'present', 'dongdong', 'rank', 'potentialdetermin', 'consum', 'sacrifici', 'normal', 'lack', 'qiang', 'danjun', 'capit', 'orcid', 'faculti', 'shandong', 'ope', 'magnesium', 'site', 'yue', 'asfabr', 'first', 'green', 'agent', 'suppli', 'electrocatalysi', 'frequent', 'upgrad', 'donglin', 'barrier', 'hard', 'yield'}

Cluster: 20, with 3 paper/s had the following terms/topics:

{'energi', 'cheap', 'ro', 'solv', 'li', 'dioxid', 'small', 'number', 'result', 'f', 'improv', 'togeth', 'versatil', 'absorpt', 'design', 'sinc', 'much', 'field', 'mild', 'particularli', 'list', 'nsw', 'zhibin', 'introduc', 'peng', 'wastewat', 'atom', 'without', 'process', 'aq', 'becom', 'convers', 'approach', 'visibl', 'liam', 'refractori', 'materi', 'friendli', 'bin', 'australian', 'right', 'c-o', 'charg', 'also', '\x02', 'three', 'leiab', 'util', 'stabl', 'hydrogel', 'enhanc', 'photocatalyst', 'driven', 'electrosynth', 'donglei', 'fuel', 'rev', 'electrosynthesi', 'requir', 'use', 'closur', 'salt', 'álvarezcontrera', 'real\xad', 'di', 'may', 'moreov', 'acmc', 'nobl', 'purif', 'induc', 'destruct', 'r', 'dashed', 'molten', 'particular', 'exacerb', 'mao', 'electronhol', 'effici', 'applic', 'storag', 'sciencedirect', 'freez', 'aop', 'hydrophil', 'keyword', 'lecheng', 'maraschki', 'still', 'contrast', 'wwwelseviercomlocatece', 'poor', 'tech\xad', 'centr', 'explos', 'updat', 'ozon', 'liad', 'cuss', 'recombin', 'ag', 'generationbas', 'captur', 'kerri', 'format', 'climat', 'sustain', '-', 'biochemistri', 'world', 'select', 'bv', 'revis', 'consider', 'elsevi', 'libin', 'hou', 'attent', 'depl', 'pure', 'anthraquinon', 'strategi', 'remedi', 'reduct', 'control', 'report', 'catalyst', 'august', 'etc', 'yuke', 'topic', 'danger', 'electr', 'access', 'co', 'electrod', 'stem', 'strategy', 'import', 'shanghai', 'shun', 'anod', 'renew', 'peroxid', 'abc', 'input', 'view', 'via', 'cal', 'research', 'state', 'continu', 'univers', 'cost', 'seek', 'juli', 'mental', 'publish', 'road', 'homepag', 'xianyun', 'redu', 'zincair', 'concern', 'degra\xad', 'case', 'economy', 'yao', 'amount', 'transform', 'e', 'rosbas', 'sipe', 'usual',

'valuabl', 'power', 'china', 'zhong', 'molecul', 'capac', 'fentonlik', 'th', 'h', 'b', 'copper', 'c', 'due', 'deep', 'et', 'dation', 'higher', 'scale', 'promis', 'clean', 'lithiophil', 'increas', 'addit', 'efficient', 'modif', 'accept', 'thenard', 'shunmaotongjieducn', 'need', 'donghai', 'reaction', 'reus', 'comprehens', 'avail', 'deplet', 'june', 'limit', '©', 'conditions-', 'formation-', 'method', 'inactiv', 'abl', 'safe', 'gaseou', 'earthabund', 'yan', 'engin', 'interest', 'ab', 'heyi', 'content', 'one', 'organonitrogen', 'water', 'receiv', 'attention-', 'product', '•oh', 'current', 'nitrogen', 'chitosan', 'carbon', 'radiat', 'synth', 'base', 'issu', 'thu', 'includ', 'collector', 'make', 'possibl', 'urgent', 'avoid', 'chen', 'emerg', 'bósquezcácer', 'biomed', 'crisi', 'activ', 'futur', 'raw', 'fertil', 'laboratori', 'octob', 'step', 'attract', 'consumpt', 'electrocatalyst', 'resourc', 'focu', 'porin', 'gener', 'scienc', 'colleg', 'polici', 'compound', 'low', 'lime', 'coupl', 'model', 'ecrr', 'neutrality'", 'sunlight', 'c-n', 'fernanda', 'sourc', 'exampl', 'cycl', 'con', 'correspond', 'bejar', 'envis', 'aquif', 'surfac', 'form', 'diffus', 'numer', 'milder', 'journal', 'supplement', 'fossil', 'point', 'wale', 'carboxymethylcellulos', 'wide', 'chu', 'sydney', 'technolog', 'yang', 'valuead', 'demand', 'ie', 'emissions-', 'byproduct', 'boost', 'societi', 'hangzhou', 'extens', 'taylor', 'ho', 'disinfect', 'lithium', 'rsclichemsocrev', 'tran', 'cite', 'south', 'n', 'ducheng', 'doi', 'rippi', 'trate', 'zhoushan', 'photo\xad', 'system', 'httpsdoiorgjcei', 'condit', 'mainstream', 'enrr', 'witteman', 'greatli', 'discuss', 'fixat', 'practic', 'c-c', 'opportun', 'behavior', 'bond', 'j', 'pair', 'metal', 'demonstr', 'larg', 'pene\xad', 'environ\xad', 'l', 'consist', 'wang', 'highli', 'rapid', 'tradit', 'patrick', 'electrocatalyt', 'solar', 'separ', 'combin', 'longer', 'yhouzjueducn', 'prospect', 'organ', 'onlin', 'ecolog', 'coulombiceffici', 'aluminum', 'hospit', 'unfortun', 'iodid', 'hot', 'adelaid', 'fenton', 'al', 'catalyt', 'desir', 'ldaiunsweduau', 'lorena', 'chemic', 'high', 'xia', 'mitig', 'multidisciplinari', 'natur', 'new', 'multistep', 'australia', 'potenti', 'biolog', 'howev', 'chengcheng', 'develop', "'electrons'", 'author', 'februari', 'chem', 'emiss', 'innov', 'fundament', 'reduc', 'oxygen', 'redox', 'synthet', 'zengab', 'adam', 'nonrenew', 'combust', 'problem', 'mgohcl', 'download', 'perform', 'concept', 'harsh', 'electrolyt', 'chang', 'chlorid', 'contain', 'email', 'membran', 'electrochem', 'previou', 'chlorin', 'address', 'maría', 'zhejiang', 'key', 'environment', 'promot', 'target', 'immobilization-', 'royal', 'chloramin', 'global', 'challeng', 'school', 'compar', 'batteri', 'soc', 'dcsc', 'advantag', 'reserv', 'studi', 'context', 'often', 'quzhou', 'cing', 'layer', 'bacteri', 'theoret', 'concentr', 'light', 'hydrogen', 'review', 'nolog', 'focus', 'institut', 'synthesi', 'pollut', 'lifetim', 'tion', 'dai', 'like', 'photocatalyt', 'degrad', 'ize', 'less', 'uniqu', 'chloridesodium', 'chemistri', 'cleanest', 'direct', 'produc', 'chemi', 'articl', "'green', 'liuab', 'abund', 'carbonneutr', 'provid', 'involv', 'advanc', 'ip', 'associ', 'secur', 'medic', 'highvaluead', 'crosslink', 'industri', 'transport', 'yangab', 'bioremedi', 'nh', 'oxid', 'sumption', 'lower', 'open', 'understand', 'critic', 'introduc', 'employ', 'present', 'zhongjian', "'reagent'", 'uv', 'risk', 'esi', "'carbon', 'tongji', 'enabl', 'infect', 'site', 'reagent', 'artifici', 'mixtur', 'block', 'first', 'green', 'josé', 'agent', 'suppli', 'electrocatalysi', 'dis\xad', 'barrier', 'hard', 'east'}

Cluster: 7, with 5 paper/s had the following terms/topics:

{'could', 'oer', 'xu', 'ion', 'energi', 'dissolv', 'zhang', 'guiyang', 'efit', 'household', 'microporos', 'altern', 'jeremi', 'gao', 'render', 'li', 'number', 'small', 'support', 'q', 'result', 'stephenson', 'assembl', 'doiorg', 'expos', 'investig', 'offer', 'nanonetwork', 'f', 'improv', 'recogn', 'linwang', 'inher', 'rang', 'qizhu', 'comosngnf', 'design', 'sinc', 'much', 'systemat', 'germani', 'list', 'particularli', 'ph', 'antimonit', 'storageconverts', 'ancillari', 'phsensit', 'homo', 'encapsul', 'shadow', 'introduc', 'path', 'excel', 'acidst', 'necess', 'directli', 'reac', 'spineltyp', 'without', 'process', 'cozif', 'rubas', 'millivolt', 'meanwhil', 'becom', 'land', 'similar', 'cheng', 'nation', 'exoskeleton', 'converts', 'approach', 'alkalinesewat', 'galway', 'ever', 'physic', 'onset', 'djyoojbnuackr', 'pthad', 'sulfur', 'cooper', 'complic', 'occur', 'graduat', 'materi', 'first', 'materialscatalyst', 'right', 'charg', 'also', 'poros', 'convent', 'quantiti', 'plantat', 'milliamper', 'radiu', 'media', 'easili', 'three', 'variou', 'owtemperatur', 'tainabl', 'electro\xad', 'stabl', 'life', 'util', 'dilut', 'ultim', 'adv', 'enhanc', 'electrolysi', 'driven', 'liu', 'prefer', 'either', 'construct', 'xray', 'outperform', 'fuel', 'oxi', 'ptcomosngnfliro', 'requir', 'use', 'set', 'known', 'overall', 'exploit', 'may', 'cobaltcatalyz', 'ficient', 'expect', 'lot', 'adsorptiondesorpt', 'proton', 'p', 'ca', 'lead', 'sector', 'pose', 'fusion', 'well', 'efficienc', 'lowcost', 'fast', 'capabl', 'insid', 'ligand', 'purif', 'induc', 'hand', 'nevertheless', 'mingyu', 'overs', 'con\xad', 'r', 'guizhou', 'illustr', 'kingdom', 'peter', 'orbit', 'us', 'pbox', 'dimension', 'particular', 'pore', 'koh', 'bridg', 'combat', 'grade', 'wenqian', 'strain', 'effici', 'applic', 'found', 'within', 'kg-', 'buffer', 'methyylimidazol', 'profici', 'stabil', 'sciencedirect', 'ajcowanliverpoolacuk', 'ef', 'ex', 'presenc', 'inc', 'lawrenc', 'keyword', 'adma', 'nitro', 'ad', 'still', 'carri', 'mosngnf', 'componentsequip', 'storabl', 'electron', 'infrastructur', 'wwwelseviercomlocatecej', 'properti', 'poor', 'centr', 'wwwadvmatd', 'footprint', 'oxygenvacancyenrich', 'reach', 'integr', 'bring', 'exam', 'hybrid', 'choic', 'reveal', 'incorpor', 'scalabl', 'ple', 'denot', 'nocera', 'format', 'desalin', 'aforement', 'geneou', 'climat', 'jin', 'sustain', '-', 'voltag', 'skin', 'wenm', 'halfcel', 'chemicalresist', 'anilin', 'select', 'deokjingu', 'durabl', 'bv', 'revis', 'consider', 'mn', 'core-shel', 'volu', 'elsevi', 'furthermor', 'cur', 'per', 'pure', 'price', 'offshor', 'strategi',

'mechanist', 'film', 'must', 'report', 'catalyst', 'august', 'inspiringli', 'yapeng', 'deal', 'core', 'plat', 'great', 'facet', 'benchmark', 'electr', 'close', 'mani', 'insul', 'access', 'co', 'fulleren', 'republ', 'energyderiv', 'domi', 'rhan', 'lin', 'hm', 'dissoci', 'electrod', 'matrix', 'ment', 'anticorros', 'function', 'two', 'poison', 'anod', 'la', 'acknowledg', 'steer', 'ing', 'renew', 'properli', 'broad', 'toler', 'year', 'group', 'stateofheart', 'impos', 'provinci', 'goal', 'mean', 'achiev', 'via', 'demon', 'work', 'tialli', 'metal-organ', 'research', 'volt', 'port', 'en', 'univers', 'nate', 'exposur', 'cost', 'electronproton', 'juli', 'unsophi', 'affin', 'signific', 'transit', 'irrubas', 'shell', 'releas', 'yin', 'outstandingli', 'configur', 'publish', 'thin', 'homepag', 'iridium', 'concern', 'financi', 'kropf', 'term', 'case', 'face', 'sugar', 'economy', 'watercatalyst', 'nano', 'drive', 'primarili', 'sic', 'e', 'alter', 'along', 'side-', 'corro\xad', 'tackl', 'dispers', 'zero', 'decay', 'power', 'paufarrasnuigalwayi', 'china', 'deloc', 'world", 'iro', 'tactic', 'molecul', 'jianguo', 'capac', 'discoveri', 'yafei', 'h', 'ten', 'nanoscal', 'reactant', 'centli', 'b', 'characterist', 'interfac', 'depend', 'reactor', 'agglomer', 'educ', 'area', 'porou', 'p', 'gain', 'fewnanomet', 'c', 'due', 'mainli', 'et', 'dation', 'hollow', 'polyoxometal', 'fabric', 'manganes', 'assimil', 'market', 'higher', 'major', 'logeshwaran', 'promis', 'clean', 'embed', 'larger', 'substanti', 'environ', 'optim', 'su', 'split', 'morpholog', 'increas', 'electrolys', 'addit', 'cowan', 'polym', 'sandia', 'accept', 'nm', 'dijia', 'intrin', 'microsheet', 'electrospun', 'need', 'interfaci', 'mv', 'gqzhangmseustceducn', 'reaction', 'yoo', 'good', 'exert', 'bubbl', 'gen', 'avail', 'comprehens', 'minim', 'dresp', 'time', 'commerci', 'hwan', 'evalu', 'sur', 'nanomateri', 'limit', '@', 'june', 'method', 'facilit', 'abl', 'test', 'protonrich', 'earthabund', 'magnitud', 'interest', 'engin', 'guop', 'ab', 'arm', 'centimet', 'content', 'relat', 'one', 'novel', 'mndope', 'water', 'hour', 'receiv', 'intens', 'social', 'remain', 'elec\xad', 'nonact', 'particl', 'pstrassertuberlind', 'daili', 'product', 'solut', 'spinel', 'counterpart', 'genat', 'oc', 'current', 'phase', 'uptod', 'trol', 'carbon', 'propos', 'restrict', 'berlin', 'base', 'deriv', 'mof', 'longterm', 'issu', 'thu', 'chong', 'tem', 'encap\xad', 'modific', 'oh', 'spinel-bas', 'extern', 'make', 'possibl', 'obtain', 'avoid', 'molecular', 'hanc', 'emerg', 'delectron', 'final', 'herein', 'qian', 'activ', 'futur', 'everincreas', 'electrolyz', 'profil', 'resist', 'platform', 'versu', 'level', 'commun', 'hui', 'laboratori', 'crystallin', 'subnanomet', 'ireland', 'electrocatalyst', 'consumpt', 'dionigi', 'resourc', 'mainten', 'step', 'intermedi', 'tyne', 'het\xad', 'coreshel', 'gener', 'vijayapradeep', 'scienc', 'nanoparticl', 'compound', 'puriti', 'oper', 'cat', 'eq', 'low', 'corpor', 'gerken', 'unstabl', 'httpswwwscienceorg', 'ruo', 'bioorgan', 'han', 'grow', 'multielectron', 'rapidli', 'afford', 'nanopl', 'mofnf', 'impact', 'armor', 'order', 'rent', 'upon', 'stress', 'implement', 'pgm', 'precursor', 'fenildh', 'usa', 'sourc', 'zeolit', 'hso', 'exampl', 'cycl', 'addi', 'abil', 'pemw', 'disk', 'inherit', 'correspond', 'mark', 'hinder', 'four', 'blockag', 'liquid', 'marin', 'rational', 'surfac', 'importantli', 'wwwnaturecomnatureenergi', 'ben', 'form', 'rucn', 'mea', 'energy-', 'reservoir', 'diffus', 'bifunction', 'numer', 'endow', 'fermi', 'identific', 'journal', 'therefor', 'joshua', 'past', 'ru', 'graphen', 'screen', 'lanthanum', 'vol', 'electrochemistri', 'hp', 'concentra', 'wide', 'scarc', 'counter', 'argonn', 'technolog', 'substan', 'gradesepar', 'demand', 'sy', 'divis', 'wind', 'strong', 'spread', 'densiti', 'headway', 'ruvruoc', 'alli', 'extens', 'ho', 'replac', 'dimens', 'dissolut', 'exist', 'essenti', 'zach', 'add', 'row', 'muniti', 'invest', 'codop', 'platinum', 'tran', 'would', 'lemont', 'worldwid', 'n', 'display', 'effect', 'doi', 'converg', 'element', 'adsorpt', 'thermost', 'cell', 'acid', 'ramakrishnan', 'superior', 'suffer', 'simultan', 'uphil', 'http', 'system', 'httpsdoiorgicej', 'condit', 'phunivers', 'sluggish', 'berkeley', 'ticat', 'twodimension', 'toward', 'theori', 'ration', 'econom', 'pritzker', 'local', 'discuss', 'mechan', 'zhu', 'evolv', 'sulat', 'retain', 'korea', 'special', 'behavior', 'bond', 'j', 'öb', 'metal', 'demonstr', 'follow', 'vacanc', 'larg', 'catalysi', 'fabio', 'lina', 'contribut', 'ae', 'com', 'v', 'functionaliza', 'uk', 'differ', 'burden', 'seawat', 'l', 'divers', 'purificationdesalin', 'wang', 'rapid', 'neutral', 'highli', 'fiber', 'oxyhydroxid', 'electrocatalyt', 'rout', 'structur', 'sampath', 'cathod', 'vo', 'impur', 'rotat', 'aspect', 'solar', 'subramanian', 'separ', 'instal', 'longer', 'sanit', 'sdg', 'amend', 'prospect', 'metric', 'sub', 'proport', 'decor', 'inter', 'onlin', 'ptbase', 'cm-', 'devel', 'decreas', 'although', 'nicof', 'sever', 'alyst', 'reticular', 'distribut', 'carbonencapsul', 'cobalt', 'rde', 'posit', 'calcul', 'exponenti', 'electrospin', 'inum', 'candid', 'paper', 'ptcomo', 'auburndal', 'glucos', 'mesopor', 'among', 'al', 'catalyt', 'desir', 'trolyt', 'exchang', 'deposit', 'interconnect', 'significantli', 'depart', 'chemic', 'trolysi', 'high', 'spinel-', 'geo', 'newcastl', 'mitig', 'natur', 'biofoul', 'new', 'merz', 'quickli', 'center', 'job', 'haixia', 'potenti', 'howev', 'robust', 'clusterscarbon', 'baekjedaero', 'w', 'regener', 'forster', 'develop', 'evolut', 'appli', 'pau', 'kim', 'hierarch', 'masstransport', 'chicago', 'author', 'februari', 'feng', 'emiss', 'sören', 'suitabl', 'presum', 'acceler', 'kind', 'nanofibr', 'reduc', 'oxygen', 'redox', 'nano\xad', 'optimiza\xad', 'loss', 'phosphat', 'sadeghi', 'speed', 'thick', 'garner', 'nanobubbl', 'jeonjusi', 'liverpool', 'maxim', 'singleatom', 'tide', 'overcom', 'problem', 'subsequ', 'alexand', 'photon', 'ruthenium', 'download', 'squar', 'courag', 'perform', 'corros', 'concept', 'nanofib', 'intern', 'strasser', 'farrà', 'erogen', 'electrolyt', 'chang', 'chlorid', 'effect', 'matric', 'geotherm', 'contain', 'kineticssluggish', 'compact', 'email', 'meet', 'yet', 'membran', 'cupat', 'natarajan', 'ideal', 'electrochem', 'microscal', 'lowtemperatur', 'address', 'ryan', 'irox', 'hydro', 'hefei', 'manner', 'key', 'environment', 'outstand',

'anoth', 'neru', 'exhibit', 'ptc', 'prioriti', 'selfheal', 'target', 'å', 'lion', 'prabhakaran', 'challeng', 'ultrasml', 'best', 'school', 'longlast', 'compar', 'respect', 'framework', 'ultrafin', 'advantag', 'bandgap', 'erami', 'reserv', 'studi', 'popul', 'often', 'remov', 'plant', 'overpotenti', 'gmbh', 'imidazol', 'reshwat', 'modifi', 'layer', 'giner', 'ergi', 'technoeconom', 'hydrogen', 'ptco\xad', 'review', 'common', 'ac', 'institut', 'intermitt', '≈', 'late', 'pollut', 'xiaomin', 'partial', 'tion', 'half', 'action', 'like', 'channel', 'composit', 'degrad', 'iron', 'valid', 'livermor', 'pt', 'kinet', 'potabl', 'unit', 'allow', 'uniqu', 'jeonbuk', 'feed', 'nafion', 'wileyvch', 'transfer', 'promin', 'atomicscal', 'chemistri', 'roghayeh', 'store', 'direct', 'court', 'bind', 'produc', 'drawn', 'prepar', 'profound', 'finetun', 'djluianglov', 'httpsdoiorgadma', 'articl', 'strate', 'mater', 'g', 'pretreat', 'wentao', 'abund', 'greenhydrogen', 'provid', 'heterogen', 'involv', 'advanc', 'selfconduct', 'rate', 'x', 'associ', 'melamin', 'xiao', 'jeollabukdo', 'glob', 'describ', 'conduct', 'secur', 'il', 'possess', 'largescal', 'sion', 'kanan', 'coo', 'tron', 'aqueou', 'recent', 'convert', 'wen', 'industri', 'second', 'transport', 'tailor', 'holey', 'oxid', 'repres', 'energet', 'est', 'lower', 'secondari', 'dft', 'technic', 'alkalin', 'anhui', 'bil', 'inadequ', 'competit', 'nanocatalysi', 'open', 'lowgrad', 'understand', 'haip', 'bk', 'salin', 'employ', 'introduct', 'ultralow', 'formu', 'critic', 'present', 'leverag', 'dong', 'tong', 'mass', 'shanmugam', 'third', 'risk', 'genqiang', 'compet', 'simplif', 'comput', 'como', 'orcid', 'fecow', 'capit', 'vari', 'ope', 'ptcarbon', 'site', 'elec', 'viabil', 'block', 'green', 'crisscross', 'electrocatalysi', 'latic', 'favor', '-oh', 'barrier', 'specif', 'yield'}

Cluster: 5, with 3 paper/s had the following terms/topics:

{'vito', 'explor', 'decemb', 'ion', 'energi', 'cheap', 'zhang', 'altern', 'huim', 'mol', 'number', 'li', 'assembl', 'small', 'result', 'nasicon', 'offer', 'f', 'togeth', 'improv', 'inher', 'peke', 'versatil', 'deliv', 'gridscal', 'elucid', 'design', 'sinc', 'much', 'germani', 'particularli', 'list', 'verlag', 'compon', 'nsw', 'cade', 'excel', 'necess', 'prolifer', 'exhaust', 'becom', 'owe', 'constraint', 'similar', 'almost', 'unpreced', 'teri', 'ever', 'motiv', 'classif', 'sulfur', 'januari', 'materi', 'decad', 'right', 'also', 'thor', 'tronic', 'find', 'variou', 'util', 'stabl', 'life', 'recharg', 'ultim', 'pulsepow', 'weight', 'adv', 'enhanc', 'zhongxu', 'overwhelm', 'fuel', 'success', 'requir', 'use', 'set', 'yuliang', 'overal', 'exploit', 'di', 'may', 'expect', 'curb', 'phlnottentuenl', 'dmitri', 'toxic', 'sector', 'pioneer', 'broadway', 'capabl', 'nevertheless', 'regard', 'r', 'httpsdoiorgsml', 'kg-', 'peter', 'option', 'cienci', 'us', 'wwwsmalljournalcom', 'handl', 'particular', 'netherland', 'highpow', 'catalyz', 'effici', 'trendsett', 'applic', 'found', 'storag', 'sciencedirect', 'stabil', 'last', 'keyword', 'notten', 'still', 'summar', 'wellestablish', 'electron', 'infrastructur', 'ecologyeconomy', 'propteti', 'centr', 'integr', 'intrins', 'tical', 'choic', 'shortag', 'regul', 'load', 'reveal', 'devic', 'conveni', 'scalabl', 'captur', 'modern', 'enter', 'aforement', 'httpswwwwevisecomprofilemtnanologin', 'sustain', 'phenomen', 'voltag', 'safeti', 'learn', 'revis', 'standbi', 'hydraul', 'sib', 'elsevi', 'penetr', 'furthermor', 'flexibl', 'hou', 'attent', 'price', 'appar', 'strategi', 'imposs', 'jülich', 'insight', 'great', 'electr', 'co', 'flexibl', 'compos', 'kw', 'prof', 'electrod', 'na', 'function', 'reliabl', 'rather', 'anod', 'roundtrip', 'import', 'paramet', 'renew', 'kga', 'year', 'substitut', 'today', 'stateoftheart', 'onacufemno', 'achiev', 'z', 'significantli', 'class', 'work', 'shunan', 'yl', 'chayambuka', 'research', 'ess', 'nanicl', 'continuu', 'en', 'univers', 'despit', 'polyaniontyp', 'cost', 'mulder', 'sodiumbas', 'seek', 'appeal', 'shape', 'patent', 'vs', 'homepag', 'dispos', 'concern', 'earlier', 'analysi', 'face', 'case', 'term', 'sml', 'nano', 'prac', 'warm', 'drive', 'transform', 'e', 'tation', 'ionic', 'hubei', 'power', 'china', 'pu', 'fullcel', 'genk', 'capac', 'earth', 'highlight', 'h', 'b', 'ee', 'characterist', 'educ', 'p', 'c', 'due', 'deep', 'grietu', 'feasibl', 'eindhoven', 'market', 'major', 'novemb', 'scale', 'clean', 'promis', 'cowork', 'optim', 'costeffect', 'hightempera', 'increas', 'addit', 'frequenc', 'oppos', 'modif', 'implemen', 'accept', 'need', 'mv', 'good', 'comprehens', 'avail', 'time', 'commerci', 'inform', '@', 'see', 'facilit', 'earthabund', 'interest', 'engin', 'naion', 'superb', 'content', 'relat', 'one', 'novel', 'soni', 'receiv', 'intens', 'remain', 'product', 'curv', 'given', 'current', 'least', 'sodium', 'figur', 'civil', 'carbon', 'prime', 'base', 'outlook', 'deriv', 'issu', 'thu', 'chanc', 'includ', 'houpkueducn', 'make', 'obtain', 'portabl', 'urgent', 'constantli', 'wh', 'molecular', 'emerg', 'chen', 'herein', 'bkllmmd', 'fig', 'believ', 'fatur', 'sive', 'level', 'inferior', 'rise', 'pare', 'laboratori', 'attract', 'gravimetr', 'resourc', 'ministri', 'gener', 'gradual', 'scienc', 'colleg', 'ltd', 'compound', 'oper', 'better', 'low', 'corpor', 'respond', 'coupl', 'adapt', 'model', 'shed', 'grow', 'rapidli', 'order', 'stationari', 'upon', 'far', 'danilov', 'magnetoelectr', 'wwwadvenergymatd', 'hold', 'sourc', 'cycl', 'exempl', 'abil', 'correspond', 'hanxi', 'form', 'incent', 'ate', 'diffus', 'kudakwash', 'journal', 'therefor', 'park', 'past', 'mw', 'bat', 'fossil', 'effi', 'screen', 'electrochemistri', 'cope', 'health', 'sydney', 'technolog', 'equal', 'yang', 'role', 'demand', 'sodiumstorag', 'densiti', 'evenli', 'extens', 'ln', 'databas', 'essenti', 'lithium', 'lish', 'worldwid', 'n', 'effect', 'doi', 'element', 'grid', 'cell', 'weinheim', 'zebra', 'play', 'superior', 'versiti', 'system', 'httpsdoiorgaenm', 'technolo', 'realiz', 'rich', 'discard', 'toward', 'elabor', 'de', 'econom', 'discuss', 'lifepo', 'hard', 'accordingli', 'mechan', '-', 'progress', 'data', 'practic', 'bicesat', 'opportun', 'modul', 'uncertain', 'hu', 'thermal', 'ai', 'demonstr', 'follow', 'match', 'geolog', 'larg', 'consid', 'contribut', 'com', 'differ', 'v', 'evergrow', 'l', 'consist', 'wang', 'rapid', 'tradit', 'beij', 'structur', 'hl', 'cao', 'cathod', 'doe', 'especi', 'instal', 'outlin', 'combin', 'primari', 'date', 'prospect', 'host', 'onlin',

'xinp', 'apart', 'ecolog', 'belgium', 'although', 'machineri', 'dr', 'candid', 'paper', 'modular', 'aenm', 'total', 'among', 'trend', 'benign', 'dwindl', 'depart', 'identif', 'high', 'call', 'natur', 'non', 'overview', 'battery', 'new', 'quickli', 'revolut', 'australia', 'geograph', 'potenti', 'implant', 'howev', 'geographicaldistribut', 'xiangjun', 'transient', 'w', 'rel', 'develop', 'httpsdoiorgjmntnano', 'wuhan', 'usher', 'next', 'author', 'paid', 'prototyp', 'innov', 'suitabl', 'zxchenpmcwhueducn', 'upscal', 'acceler', 'evidenc', 'ubiquit', 'fundament', 'reduc', 'averag', 'loss', 'iek', 'phosphat', 'alreadi', 'labscal', 'pumpedhydro', 'combust', 'expen', 'perform', 'forschungszentrum', 'electrolyt', 'chang', 'postbu', 'compact', 'meet', 'email', 'smallscal', 'yet', 'ideal', 'electrochem', 'era', 'even', 'hazard', 'address', 'mileston', 'made', 'hydro', 'key', 'environment', 'outstand', 'exhibit', 'pump', 'promot', 'domin', 'growth', 'nowaday', 'global', 'challeng', 'school', 'compar', 'histor', 'pub', 'instanc', 'standard', 'batteri', 'reserv', 'often', 'scarciti', 'gmbh', 'ergi', 'light', 'polyanion', 'hydrogen', 'ylcaowhueducn', 'review', 'focus', 'intermitt', 'synthesi', 'energyvil', 'sodiumion', 'entir', 'tion', 'lifetim', 'cheaper', 'like', 'news', 'iron', 'kinet', 'unit', 'zhao', 'stage', 'wileyvch', 'crust', 'chemistri', 'size', 'steep', 'volumetr', 'articl', 'insepar', 'mb', 'mater', 'share', 'lib', 'g', 'abund', 'vehicl', 'provid', 'assess', 'advanc', 'efficienc', 'rate', 'x', 'inexhaust', 'multiscal', 'conduct', 'coulomb', 'largescal', 'esss', 'recent', 'industri', 'ture', 'enorm', 'vulner', 'output', 'applica', 'advers', 'lower', 'secondari', 'account', 'look', 'guidanc', 'competit', 'understand', 'introduc', 'present', 'particip', 'full', 'dong', 'consum', 'impli', 'k', 'histori', 'gie', 'enabl', 'orcid', 'elec', 'hlzhaoustbeducn', 'smart', 'respons', 'lithiumion', 'boeretang', 'postpon', 'nasourc', 'specif}

Cluster: 11, with 1 paper/s had the following terms/topics:

{'could', 'franscisco', 'potenti', 'decemb', 'underlin', 'access', 'root', 'co', 'impact', 'energi', 'commit', 'howev', 'leng', 'solv', 'develop', 'estim', 'dioxid', 'support', 'reliabl', 'result', 'voltaic', 'import', 'outcom', 'author', 'sourc', 'renew', 'yogyakarta', 'f', 'improv', 'mape', 'correspond', 'underemphas', 'benefit', 'emiss', 'licens', 'compel', 'sarjiyaugmacid', 'gridscal', 'show', 'mean', 'goal', 'particularli', 'list', 'achiev', 'form', 'continu', 'caus', 'cost', 'turn', 'combust', 'therefor', 'period', 'journal', 'yield', 'surakarta', 'process', 'fossil', 'signific', 'suar', 'perform', 'interrupt', 'initi', 'publish', 'intern', 'net', 'chal\xad', 'flow', 'homepag', 'chang', 'mokhammad', 'isnaeni', 'occupi', 'degra\xad', 'health', 'plan', 'driver', 're', 'concern', 'pv', 'face', 'pari', 'uncertainti', 'spike', 'technolog', 'email', 'demand', 'economi', 'electrochem', 'ideal', 'shift', 'effort', 'friendli', 'era', 'wind', 'absolut', 'wwwsciencedirectcomjournalresultsinengin', 'address', 'differ\xad', 'byncnd', 'boost', 'e', 'along', 'rul', 'approxim', 'also', 'zero', 'environment', 'prove', 'aid', 'peaktoaverag', 'earli', 'apribowo', 'collabor', 'hadi', 'power', 'broader', 'growth', 'equip', 'sebel', 'world', 'adopt', 'ghg', 'global', 'challeng', 'greenhous', 'util', 'life', 'peak', 'n', 'effect', 'batteri', 'b', 'agreement', 'ncnd', 'context', 'studi', 'factor', 'grid', 'reli', 'c', 'due', 'photo\xad', 'fuel', 'affect', 'gadjah', 'chico', 'dation', 'use', 'system', 'variat', 'nolog', 'ac', 'predict', 'crucial', 'intermitt', 'scale', 'promis', 'clean', 'novemb', 'indonesia', 'toward', 'previous', 'lead', 'environ', 'optim', 'well', 'sasongko', 'gradient', 'xgboost', 'nze', 'increas', 'degrad', 'algorithm', 'addit', 'brillianto', 'unit', 'coal', 'align', 'accept', 'percentag', 'r', 'network', 'practic', 'fluctuat', 'determin', 'need', 'direct', 'tune', 'diagnos', 'ensur', 'bambang', 'thermal', 'avail', 'therebi', 'finetun', 'rmse', 'time', 'evalu', 'articl', 'inform', '©', 'effici', 'enc', 'method', 'within', 'contribut', 'storag', 'temperatur', 'signif\xad', 'error', 'sciencedirect', 'serv', 'l', 'aim', 'engin', 'ab', 'httpsdoiorgjirineng', 'relat', 'content', 'keyword', 'receiv', 'contributor', 'remain', 'press', 'product', 'solut', 'nations', 'aspect', 'tech\xad', 'especi', 'integr', 'hermanu', 'accur', 'industri', 'universita', 'liion', 'sdg', 'output', 'scenario', 'cc', 'httpcreativecommonsorglicensesbi', 'carbon', 'account', 'onlin', 'base', 'ratio', 'deriv', 'maret', 'decreas', 'although', 'open', 'includ', 'manag', 'critic', 'introduc', 'ga', 'hyperparamet', 'climat', 'voltage', 'sustain', 'impli', 'variabl', 'posit', 'safeti', 'avoid', 'learn', 'wijaya', 'bv', 'revis', 'total', 'elsevi', 'oil', 'unexpect', 'pramono', 'mainten', 'respons', 'strategi', 'extrem', 'depart', 'diminish', 'focu', 'high', 'gener', 'significantli', 'lithiumion', 'danang', 'mada', 'oper', 'suppli', 'machin', 'setyonegoro', 'natur', 'bess', 'icantli', 'model', 'specif', 'sarjiya', 'center', 'electr}

Cluster: 15, with 2 paper/s had the following terms/topics:

{'explor', 'decemb', 'ion', 'energi', 'hoseinifar', 'maximum', 'done', 'real', 'result', 'expos', 'cu-', 'fisheri', 'disinteg', 'improv', 'rang', 'absorpt', 'field', 'compon', 'h-', 'vijayaram', 'atom', 'wastewat', 'joint', 'process', 'biotechnolog', 'ammonia', 'owe', 'darkfield', 'urmia', 'approach', 'thesiz', 'physic', 'thermocatalysi', 'synthes', 'wound', 'occur', 'friendli', 'art', 'also', 'hossein', 'quantiti', 'media', 'anticanc', 'stabiliz', 'techuniversité', 'three', 'variou', 'stabl', 'forc', '—', 'enhanc', 'driven', 'electrolysi', 'xray', 'outperform', 'fuel', 'use', 'suggest', 'terra', 'sector', 'teach', 'efficienc', 'pivot', 'assynthes', 'exclus', 'pharmaceut', 'revers', 'particular', 'effici', 'applic', 'found', 'stabil', 'diagnost', 'keyword', 'hame', 'electron', 'centr', 'reach', 'agro-bio', 'extracellular', 'reveal', 'imper', '—', 'safeti', 'diffract', 'ecofriendli', 'operando', 'rhe', 'microscop', 'regen', 'reduct', 'extrem', 'report',

'catalyst', 'topic', 'restructur', 'fourier', 'xrd', 'function', 'transmi', 'import', 'ing', 'treatment', 'singl', 'group', 'cal', 'research', 'univers', 'haadf', 'analys', 'publish', 'photometri', 'nuclear', 'cu', 'restor', '·', 'confirm', 'transform', 'yun-zhang', 'imag', 'sey', 'china', 'jmusunyunzhangcom', 'copper', 'due', 'gembloux', 'uv-vi', 'higher', 'coiminator', 'tech', 'previous', 'intracellu', 'costeffect', 'sem', 'india', 'accept', 'nm', 'reaction', 'atmospher', 'xiamen', 'concurr', 'nanotechnolog', 'inform', '©', 'infrar', 'mahdieh', 'method', 'nadu', 'raeeszadeh', 'hamedghafarialumniutacir', 'cu-n', 'immunoth', 'switch', 'relat', 'hindusthan', 'receiv', 'sciencebusi', 'httpsdoiorg', 'selenium', 'agricultur', 'product', 'help', 'probiolab', 'nitrogen', 'agrobio', 'includ', 'tem', '~', 'microscopi', 'march', 'emerg', 'biomed', 'herein', 'activ', 'versu', 'hari', 'resourc', 'nanoparticl', 'scienc', 'colleg', 'techniqu', 'upon', 'sanandaj', 'potentialinduc', 'sourc', 'nontox', 'icp', 'postdeposit', 'live', 'tissu', 'dye', 'vol', 'intracrani', 'bioengin', 'api', 'nitrat', 'annular', 'role', 'ambient', 'densiti', 'molnh', 'microbi', 'sun', 'trait', 'topdown', 'medicin', 'n', 'element', 'cell', 'viz', 'play', 'condit', 'spectro', 'theori', 'de', 'lar', 'scan', '■', 'part', '—', 'percentag', 'trace', 'genuin', 'licenc', 'metal', 'mg', 'seerangaraj', 'abstract', 'pathway', 'v', 'rout', 'azad', 'structur', 'antimicrobi', 'bottomup', 'especi', 'combin', 'extract', 'character', 'onlin', 'iran', 'cm—', 'ftir', 'belgium', 'sever', 'act', 'vasantharaj', 'calcul', 'eco', 'depart', 'chemic', 'dentistri', 'gold', 'np', 'natur', 'overview', 'potenti', 'biolog', 'conjunct', 'instrument', 'plantbas', 'develop', 'appli', 'basic', 'author', 'biochemi', 'suitabl', 'springer', 'phytochem', 'ubiquit', 'reduc', 'singleatom', 'subsequ', 'corrobor', 'chang', 'yet', 'biosens', 'electrochem', 'environment', 'lièg', 'compar', 'syn', 'llc', 'gorgan', 'farada', 'branch', 'plant', 'review', 'focus', 'gcu', 'synthesi', 'heal', 'interact', 'inexpens', 'like', 'degrad', 'iron', 'lieg', 'unit', 'less', 'islam', 'seerengaraj', 'jimei', 'synchron', 'tamil', 'tool', 'silver', 'identifi', 'provid', 'advanc', 'rate', 'pressur', 'vital', 'sion', 'convert', 'nh', 'oxid', 'razafindralambo', 'aggreg', 'mask', 'introduc', 'mass', 'bioecoagro', 'spectroscopi', 'ghafarifarsani', 'faculti', 'site', 'categor', 'huge', 'respons', 'metalmet', 'afm', 'green', 'agent', 'april', 'electrocatalysi', 'plasmaassist', 'yield'}

Cluster: 8, with 2 paper/s had the following terms/topics:

{'x01o', 'energi', 'x01ijt\x01sfrvjsft\x01uif\x01ifmq\x01pg\x01dbubmzujd', 'fofshz', 'indepth', 'small', 'improv', 'design', 'x01bt', 'x01boe\x01fofshz\x0f\x01if\x01dpouspm\x01pg\x01difnjdbm\x01sfbdujpot\x01jt\x01uif', 'x01ut', 'detail', 'x01podf\x01tbj', 'atom', 'joup\x01joefqfoefou\x01fmfduspojd\x01fofshz\x01mfwfmt\x0f\x01z\x01qsfjdftfmz\x01sfhvmbujoh', 'tzouiftjt', 'x01tfsjft', 'without', 'x01tjhojgdbou', 'x01cz', 'joufsbdujo', 'x01po', 'convers', 'thermocatalysi', 'ivnbot\x01dpvme\x01ejsfdumz\x01bssbohfx\x01bupnt\x01boe\x01npmfdvmft\x01bt\x01offefe\x01up', 'materi', 'friendli', 'پسپپپپپouspevdujo', 'x01sfbdbou', 'also', 'x01nfsjdbo', 'x01sfbdujo', 'x01tbnf', 'convent', 'x01qspdftht', 'x01gspn\x01uif\x01joevtusjbm\x01qspevdujo\x01pg', 'variou', 'util', 'x01gjfmf', 'x01cjpufdiopmphz', 'driven', 'wangš', 'liu', 'wangdingshengmailtsinghuaeducn', 'dpsf\x01boe\x01lfz\x01pg\x01difnjdbm\x01tdjfodf\x0f\x01px\x01up\x01nblfx\x01difnjdbm\x01sfbdujpot', 'x01ijob', 'use', 'x01fjkjoh\x01x12x11x11x11x19x15', 'x01pg', 'jiabin', 'x01ibt', 'guid', 'x01ijtupsz', 'x01gbnpvt', 'x01sfgjojh', 'effici', 'x01bdijfwf', 'error', 'x01sfmbufe', 'x01uifn', 'x01ifsfgpsf', 'still', 'summar', 'x01gspn\x01joevtusjbm\x01ojusphfo', 'x01iuisf\x01jt\x01qmfoz\x01pg\x01sppn\x01bu\x01uif\x01cpuupnw', 'x01oboptdjfodf', 'x01cbtfe', 'mfe', 'x01x12o\x01x15x0f', 'x01jotfqbsbcmf', 'aforement', 'x01hpbm', 'consider', 'x01bdijfwjoh', 'x01jefb', 'strategi', 'cbdl\x01up\x01uif\x01mbuf\x01x12x1aui\x01dfouvz', 'x01ufdiopmphz\x0f', 'report', 'relationship', 'catalyst', 'etc', 'qiztdjtu', 'great', 'co', 'x01ofx', 'function', 'x01obopdifnjtus', 'import', 'singl', 'x01uijt', 'structure-act', 'x01cfo', 'x01sfbdbout', 'sfbdujpot\x0f', 'x01fwjefou', 'pcfm\x01sjf\x01jo\x01iztdt\x01jo\x01x12x1a\x01x17x16x0f\x01jodf\x01uif\x01x12x1a\x01x1a\x01x11t', 'x01x17x0f\x01f\x01xpo\x01uif', 'yao', 'x01usjbm\x01eboe\x01efssp', 'sfqsftfoubujwf\x01ipu\x01bsfbt\x01pg\x01xjeftqsbe\x01dpodfso\x0f\x01boptdjfodf\x01bo', 'fggdjdfou\x01dbubmztu\x01tzouiftjt\x01jt\x01bo\x01jnqpsubou\x01dibmmfohf\x01gps\x01cbtjd\x01bo', 'dispers', 'x01up', 'x01fttfodf', 'nbufsjbmt', '☒', 'molecul', 'difnjdbm', 'x01spmf', 'x01dbubmztut', 'trialanderror', 'x01fmfduspojd', 'پ', 'x01sbut\x0f', 'x01ujnf', 'x01boe\x01ju\x01jt\x01bmtp\x01uif\x01ejsfdujo\x01boe\x01esjw', 'x01npsf', 'x01xjmm', 'reaction', 'comprehens', 'efwfmppqnou\x01pg\x01obopufdiopmphz\x01jo\x01uif\x01guvsvf\x01x16', 'nanomateri', 'npsf\x01qsfjdftf\x01boe\x01dpouspmmbcmf', 'x01gp', 'method', 'x01tubuft', 'x01cfuxffo', 'x01dbo', 'x01qspcmfnt', 'inbudifew', 'remain', 'httpsdoiorg', 'product', 'š', 'current', 'x01jo\x01eefqui', 'uif\x01qfuspmfvn\x01sfgjojh\x01joevtus', 'outlook', 'x01mjgf', 'gppe\x01qspcmfnt', 'x01cboet', 'x01uispvhi', 'final', 'x01ifbmui', 'x01dbubmzujd', 'x01gspn', 'scienc', 'hmpcbmmz\x0f', 'x01tzouiftjt', 'oper',

'gpsdf\x01uibu\x01sftfbsdifst\x01ibwf\x01cffo\x01tusjwjoh\x01gps\x0f', '\x01dibohf', '\x01qbsujdmft\x0f', '\x01sfmz', 'fqbsunfou\x01pg\x01ifnjtus', '\x01cjpmpzh', '\x01dbubmztu', 'accord', '\x01ijmmjqt', '\x01qspevdut', 'gjbujpo\x01up\x01bnnpoj\x01tzouiftjt\x01wjb\x01bcfsopdti\x01qspdf', '\x01bubmzujd', '\x01qspshftt', 'joevtus\x01ibt\x01jnqspwfe\x01uif\x01gfsujmjuz\x01pg\x01uif\x01mboe\x01boe\x01bmmfwjbufe\x01pv', '\x01xijdi\x01dbo\x01cf', 'correspond', 'bewbodf', '\x01spn', 'therefor', '\x01qmbz', '\x01jnqpsubou', '\x01tp\x01uibu\x01bu\x01mbtu', 'dingsheng', '\x01bsf\x01uif\x01nptu', '\x01sfbdujpot\x0f', 'qiztjdt', 'valuead', '\x01boe\x01mbufs\x01up\x01uif\x01dbubmzujd\x01qpmznf', '\x01difnjdbm', 'densiti', 'boost', 'sfbdujpot', '\x01tdjfodf', 'ligang', '\x01npoh', '\x01bqqmjdbujpo', 'featur', 'ho', 'effect', 'n', 'tvmgvsjd\x01bdje\x01up\x01uif\x01dimps\x01ebmlbmj\x01joevtus', '\x01fzonbo', '\x01jo', '\x01bmmfwjbufe', '\x01x19\x01x16\x06', '\x01pvu', '\x01bnnpoj', '\x01dpoujovpvt', '\x01if', 'theori', 'ration', '\x01nvmuj\x01eejtdjqmjobsz', 'discuss', 'vnbo', '-', '\x01qspdf', 'fdjwfe\x01b\x01x13\x01x15\x01vof\x01x13\x01x11\x01x13\x01x14\x01x10\x01fwjtfe\x01b\x01x12\x01x19\x01vmz\x01x13\x01x13\x01x14\x01x10\x01ddfqufe\x01b\x01x13\x01x14\x01vmz\x01x13\x01x11\x01x13\x01x14', '\x01tjohivb\x01ojwfstjuz', '\x01cf', '\x01xijdi', 'sfwpmvujpo\x01sfqsftfoufe\x01cz\x01jogpsnbujpo\x01ufdiopmphz', '\x01bmt', 'wang', 'tradit', '\x01fmfduspoj', '\x01qspevdupo', 'wu8', '\x01joevtus\x0f', '\x01qpjoujoh', 'character', 'ufdiopmphz', 'although', 'hsbevbmmz\x01gpsnfe\x01xpsmexjef\x01jo\x01uif\x01x12\x01x1a\x01x19\x01x11t\x01boe\x01x12\x01x1a\x01x1a\x01x11t', '\x01b\x01ufdiopmphjdbm', '\x01fud\x0f', '\x01tzouifujd', 'cspvhiu', '\x01obop', 'psjhjobmmz', 'chemic', 'qspqptfe\x01uif\x01jefb\x01pg\x01hsbevbmmz\x01tisjoljoh\x01uif\x01efwjdf', 'shunwu', 'develop', '\x01bubmztut', 'easi', '\x01sfbdujpot', 'djfoujtut\x01ibwf\x01gpvoe\x01uibu\x01xifo\x01qbsujdmft\x01sfbdi\x01uif\x01oboptdbmf', 'acceler', 'dbubmztut', 'ufdiopmphz\x0f', '\x01mbufs\x01up', '\x01sfgpsnbujpo', 'bqqmjfe\x01sftfbsdi\x01jo\x01dbubmztjt', '\x01sfhvmbujoh', '\x01pv', 'previou', 'nbovgbduvsf', 'address', '\x01tvd', 'tzouiftjt\x01pg\x01qpmznfst\x01fosjdift\x01pvs\x01ebjnz\x01ofdfjtjuf\x0f', 'cn', 'environment', '\x01efwfmqnfou', 'challeng', '\x01x12\x01x1a\x01x16\x01a', 'compar', '\x01npefso', '\x01usbdf', 'fwfsz\x01vqebuf\x01pg\x01dbubmztut\x01xjmm\x01usjhhs\x01b\x01ivhf\x01usbotgpsnbujpo\x01jo\x01uif', '\x01obopufdiopmphz', 'studi', 'jhboh\x01boh\x01boe\x01jbcjo\x01v\x01dpousjcvufe\x01frvbmzm\x01up\x01uijt\x01xpsl\x0f', '\x01cbssjf', '\x01jt', '\x01fnfshjoh', 'photocatalysi', 'review', 'huan', '\x01joufsbdujpo', 'synthesi', '\x01ejtqfstf', 'chemistri', '\x01dbubmztu\x01b', 'prepar', 'articl', 'fowjsponf', '\x01jdibs', '\x01b', 'rate', 'a_tjohivb\x01ojwfstjuz\x01sftt\x01x13\x01x11\x01x13\x01x14', '\x01fofshz', '\x01bmm\x0f', 'bopdifnjtus\x01jt\x01pof\x01pg\x01uif\x01nptu\x01jnqpsubou\x01poft', 'trial', '\x01ufdiopmphz', '\x01boe', 'convert', 'industri', '\x01bo', '\x01uif\x01qspevdupo\x01pg\x01mpx\x01emfwfm\x01izespdbscpot\x01uispvhi', 'dft', 'guidanc', 'issn', '\x01qsfdjtf', '\x01bsf', 'bddfmsbuf', '\x01pwf', '\x01joevtus', '\x01wbsjpvt', 'mass', 'appropri', 'sbujpobm\x01eftjho', '\x01uif', 'uif', 'qfuspnmfvn', 'green', 'electrocatalysi', '\x01u', '\x01nmpmfdvmft', 'type'}

Cluster: 10, with 1 paper/s had the following terms/topics:

{'nashsutcliff', 'energi', 'indic', 'newli', 'matrix', 'develop', 'result', 'paramet', 'irradi', 'intellig', 'envisag', 'mape', 'forecast', 'establish', 'methodolog', 'year', 'input', 'mean', 'taylor', 'surfac', 'absolutepercentag', 'speed', 'research', 'state', 'statist', 'perform', 'mwp', 'pv', 'pearson', 'valu', 'ambient', 'diagram', 'wind', 'project', 'coefficient', 'pr', 'rsm', 'neurofuzzi', 'environment', 'rootmeansquar', 'databas', 'anfi', 'valuabl', 'power', 'three', 'farm', 'would', 'kuzhalmannam', 'studi', 'plant', 'use', 'system', 'system', 'crucial', 'predict', 'air', 'kerala', 'econom', 'india', 'data', 'ann', 'network', 'r', 'determin', 'correl', 'ai', 'demonstr', 'rmse', 'name', 'neural', 'precis', 'tool', 'temperatur', 'error', 'photovolta', 'aim', 'efficienc', 'policymak', 'keyword', 'nsce', 'solar', 'accur', 'instal', 'kge', 'ratio', 'employ', 'present', 'sustain', 'infer', 'klinggupta', 'artifici', 'artifici', 'respons', 'gener', 'techniqu', 'annual', 'oper', 'adapt', 'model', 'yield'}