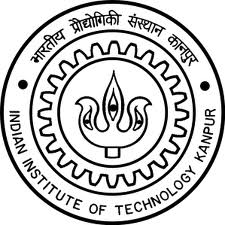
**Students’ Placement Office, IIT Kanpur**

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| **Title of the Project** | Different Silica Supports Catalyst Synthesis for Hydrodesulfurization. |
| **Commencement Date** | 07-01-2025 |
| **Completion Date** | 11-05-2025 |
| **Project Supervisor** | Prof. Sri Sivakumar |
| **Organization/Institution where the Project was accomplished** | Indian Institute of Technology Kanpur |
| **Project Description** (You can use extra A4 sheets in case you run out of space however the extra sheets should also have the seal & signature of the Project Supervisor or the relevant authority ) | |
| **Objective**  • Develop and validate Ni–Mo catalysts supported on amorphous Al₂O₃ blended with different silica supports (MCM-41, SBA-15, KIT-6, SiO₂) for hydrodesulfurization (HDS) of refractory sulfur compounds (e.g., dibenzothiophene).  **Approach**  • Synthesized amorphous Al₂O₃ via thermal decomposition of Al(NO₃)₃·9H₂O in oleyl amine with surfactants and prepared silica variants (MCM-41, SBA-15, KIT-6).  • Formulated support blends (87% am-Al₂O₃ + 13% silica variants) using attrition mixing to obtain homogeneous support matrices.  • Prepared catalysts by citric acid assisted wet impregnation of Ni and Mo precursors onto supports, followed by controlled drying and calcination at 550 °C (2 °C/min ramp).  • Standardized laboratory procedures: pelletization, sieving, centrifugation/acetone washing, sonication, controlled drying; implemented vibration filling and helium + soap-bubble leak testing for reactor loading.  • Automated stoichiometry and scale-up: developed a documented MATLAB script to compute reagent/support weights for any target catalyst mass and composition, enabling rapid recipe generation and error reduction.  **Results / Outcome / Impact**  • Produced seven reproducible amorphous-Al₂O₃ batches and synthesized five catalyst compositions (15%, 20%, 30%, 35%, 50% active loadings) plus three silica-variant catalysts at 20% loading — a ready library for systematic HDS testing.  • Delivered a reusable MATLAB tool that removed manual stoichiometric errors and accelerated formulation planning, improving experimental throughput and reproducibility.  • Established documented, repeatable lab protocols and validated reactor loading procedures, enhancing experimental safety and consistency for downstream performance evaluation. | |

**Project Verification Form**

**By appending your signatures to this form you acknowledge and agree that:**

* This form along with the certificate would serve as the official document between the project supervisor and Students Placement Office, IIT Kanpur regarding verification of the student’s project work
* The student will provide additional information and documentation relevant to his/her project upon request by the Students’ Placement Office
* The student has clearly defined his/her individual role in projects done in cooperation with other students, faculty, groups or company personnel.
* Incorrectly over-stating the reach, impact and/or quantitative/qualitative results of a project is unethical.
* In case of violation of any of the above rules, Students’ Placement Office, IIT Kanpur reserves the right to take necessary action including de-registering the student from the placement season and reporting the misconduct to the Institute Authorities.

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| **Submitted by:-** | **Project Supervisor Details:-** |
| Name: Bhavishya Gupta | Name: Prof. Sri Sivakumar |
| Roll No: 220295 | Designation: Professor, Department of Chemical Engineering |
| Signature: | Signature: |