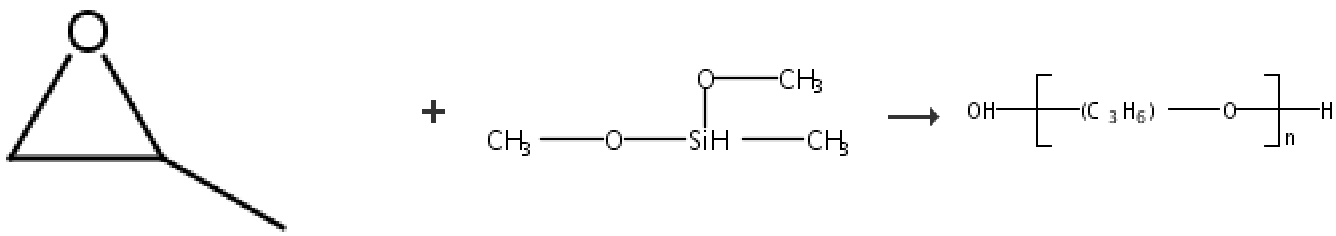
1. Single Step



dimethoxymethylsilyl-terminated

Overview

Steps/Stages

1.1 R:MeC(CH_2Cl)=CH_2, C:19412-90-9, S:MeOH

1.2 R:BHT, S:Me(CH_2)$_4$Me, 90°C

1.3 R:

R:S, C:11057-89-9, S:PhMe, S:Xylene, 90°C; 5 h, 90°C

Notes

polypropylene glycol added as an initiator,alternate reaction conditions also shown, Reactants: 2, Reagents: 4, Catalysts: 2, Solvents: 4, Steps: 1, Stages: 3, Most stages in any one step: 3

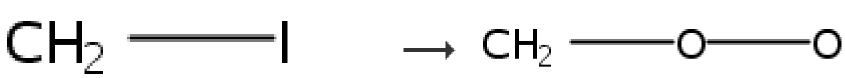
References

Curable silicon group-containing polyether sealing compositions with reduced stickiness, tensile strength and elasticity for architectural uses

By Odaka, Hidetoshi et al

From Eur. Pat. Appl., 1036807, 20 Sep 2000

2. Single Step



Overview

Steps/Stages

1.1 R:

298K

Notes

kinetic study, UV light (248 nm) used, photochemical, Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

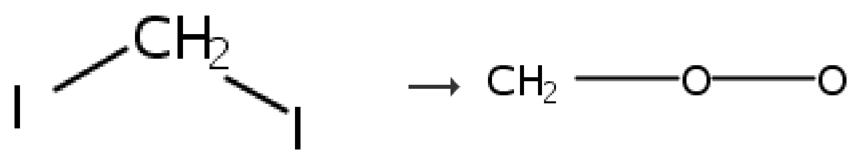
Rate coefficient of the reaction CH2OO + NO2 probed with a quantum-cascade laser near 11 µm

By Luo, Pei-Ling et al

From Physical Chemistry Chemical Physics, 21(32), 17578-17583; 2019

CASREACT ®: Copyright © 2020 American Chemical Society. All Rights Reserved. CASREACT contains reactions from CAS and from: ZIC/VINITI database (1974-1999) provided by InfoChem; INPI data prior to 1986; Biotransformations database compiled under the direction of Professor Dr. Klaus Kieslich; organic reactions, portions copyright 1996-2006 John Wiley & Sons, Ltd., John Wiley and Sons, Inc., Organic Reactions Inc., and Organic Syntheses Inc. Reproduced under license. All Rights Reserved.

3. Single Step



Overview

Steps/Stages

1.1 R:

298K

Notes

248 nm used, photochemical, Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

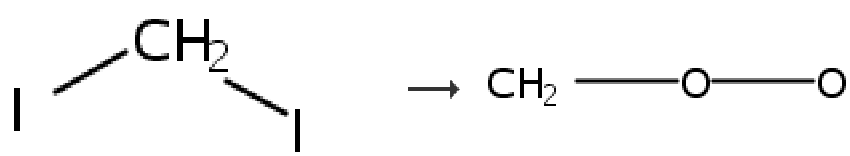
References

Identification and Self-Reaction Kinetics of Criegee Intermediates syn-CH3CHOO and CH2OO via High-Resolution Infrared Spectra with a Quantum-Cascade Laser

By Luo, Pei-Ling et al

From Journal of Physical Chemistry Letters, 9(15), 4391-4395; 2018

4. Single Step



Overview

Steps/Stages

1.1 R:

Notes

laser photolysis (248 nm) used, photochemical, Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

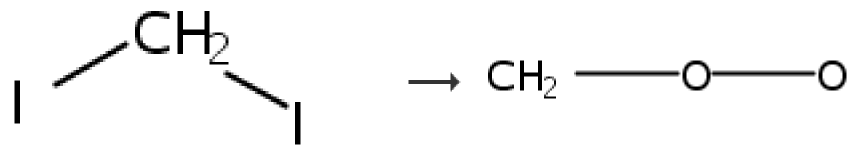
References

Direct kinetics study of CH2OO + methyl vinyl ketone and CH2OO + methacrolein reactions and an upper limit determination for CH2OO + CO reaction

By Eskola, Arkke J. et al

From Physical Chemistry Chemical Physics, 20(29), 19373-19381; 2018

5. Single Step



Overview

Steps/Stages

1.1 R:O_3

R:

Notes

aerobic, photochemical (UV lamp used (352 nm)), Reactants: 1, Reagents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Kinetics of the simplest Criegee intermediate reaction with ozone studied using a mid-infrared quantum cascade laser spectrometer

By Chang, Yuan-Pin et al

From Physical Chemistry Chemical Physics, 20(1), 97-102; 2018

Reaction Protocol

Procedure 1. Photolyzedus CH_2I_2 (1-7 mTorr) mixed with O_2 (30 or 100 Torr) an unfocused excimer laser beam at 352 nm (laser fluence: (1.3-4.4) x 10^{16} photon cm^{-2}).
2. Synthesize the O_3 gas using acommercial ozone generator, collect by adsorption on silica gel at dry-ice temperature and purify by condensation in a stainless steel cylinder at liquid-nitrogen temperature.

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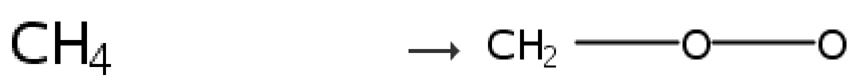
6. Single Step



Overview

Steps/Stages

Notes

1.1 R:

Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Relatively Selective Production of the Simplest Criegee Intermediate in a CH4/O2 Electric Discharge: Kinetic Analysis of a Plausible Mechanism

By Nguyen, Thanh Lam et al

From Journal of Physical Chemistry A, 119(28), 7197-7204; 2015

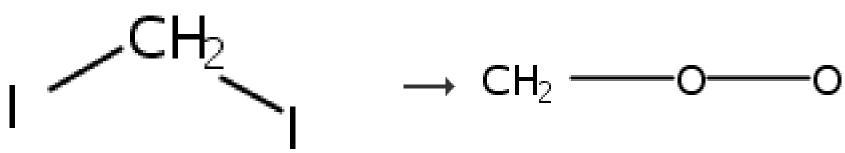
Reaction Protocol

Procedure 1. Pass a mixture of CH_4 and O_2 gases through an electric discharge and the simplest Criegee.

View more...

View with MethodsNow

7. Single Step



Overview

Steps/Stages

1.1 R:

rt, 20 psi

Notes

photochemical, KrF laser used, vacuum chamber used, Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

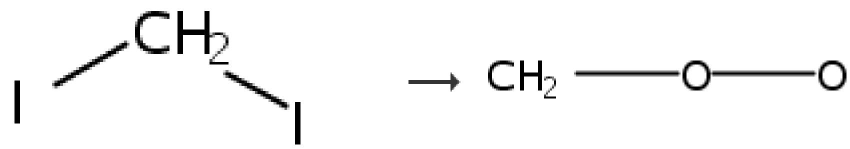
References

Early time detection of OH radical products from energized Criegee intermediates CH2OO and CH3CHOO

By Lu, Lu et al

From Chemical Physics Letters, 598, 23-27; 2014

8. Single Step



Overview

Steps/Stages

1.1 R:

343K

Notes

photochemical, frequency-tripled neodymium-doped yttrium aluminum (355 nm) used, Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

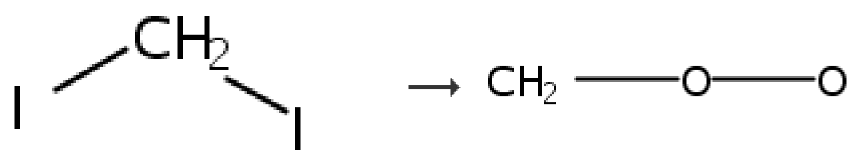
References

Extremely rapid self-reaction of the simplest Criegee intermediate CH2OO and its implications in atmospheric chemistry

By Su, Yu-Te et al

From Nature Chemistry, 6(6), 477-483; 2014

9. Single Step



Overview

Steps/Stages

1.1

1.2 R:

25 psi

Notes

photochemical, gas phase, UV light irradiation (248 nm), Reactants: 1, Reagents: 1, Steps: 1, Stages: 2, Most stages in any one step: 2

References

Ultraviolet Spectrum and Photochemistry of the Simplest Criegee Intermediate CH2OO

By Beames, Joseph M. et al

From Journal of the American Chemical Society, 134(49), 20045-20048; 2012

Experimental Procedure

This new synthetic route was implemented in the present study to generate CH_2OO, but the low pressure flow cell was replaced with a quartz capillary tube affixed to a pulsed valve as the reaction vessel. (This approach mirrors the one employed in this laboratory in previous studies of the HOONO isomer of $HONO_2$.[15]) CH_2I_2 vapor was entrained in a 20% O_2/Ar carrier gas mixture at 25 psi and photolyzed with 248 nm radiation from an excimer laser as the gas pulse passed through the capillary tube (1 mm bore, 26 mm length). The photoproducts (and unreacted gases) then were cooled in a supersonic expansion and flowed downstream as isolated species (~100 μs flight time) to a time-of-flight mass spectrometer, where they were ionized with a single photon of VUV radiation at 118 nm (10.5 eV; generated by frequency tripling of the third harmonic output of a Nd:YAG laser in a Xe:Ar gas cell). We observed a signal at *m/z* 46 when 248 nm photolysis occurred along the capillary; no *m/z* 46 signal was observed when photolysis occurred downstream of the capillary exit or the photolysis laser was blocked. Only the Criegee intermediate and no other CH_2OO isomers can be photoionized at 10.5 eV[12]. CH_2OO isomer.

Reaction Protocol

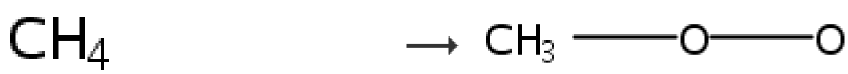
Procedure

1. Add CH_2I_2 vapor into a 20% O_2/Ar carrier gas mixture at 25 psi.
2. Photolyze the mixture with 248 nm radiation from an excimer laser as the gas pulse passed through the capillary tube (1 mm bore, 26 mm length).

View more...

View with MethodsNow

10. Single Step



Overview

Steps/Stages

1.1 R:N_2

R:

R:Cl_2

Notes

GAS PHASE, PHOTOCHEM., HYDROGEN PEROXY RADICAL ALSO FORMED, METHANOL ALSO PRESENT IN REACTANT MIXTURE, Reactants: 1, Reagents: 3, Steps: 1, Stages: 1, Most stages in any one step: 1

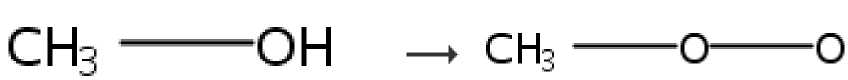
References

The temperature dependence of the rate constant for the hydroperoxy + methylperoxy gas-phase reaction

By Dagaut, Philippe et al

From Journal of Physical Chemistry, 92(13), 3833-6; 1988

11. Single Step



Overview

Steps/Stages

1.1 R:N_2

R:

R:Cl_2

Notes

GAS PHASE, PHOTOCHEM., HYDROGEN PEROXY RADICAL ALSO FORMED, METHANE ALSO PRESENT IN REACTANT MIXTURE, Reactants: 1, Reagents: 3, Steps: 1, Stages: 1, Most stages in any one step: 1

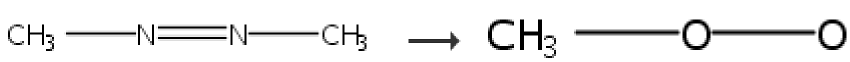
References

The temperature dependence of the rate constant for the hydroperoxy + methylperoxy gas-phase reaction

By Dagaut, Philippe et al

From Journal of Physical Chemistry, 92(13), 3833-6; 1988

12. Single Step



Overview

Steps/Stages

1.1 R:

R:SO_2

Notes

Reactants: 1, Reagents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

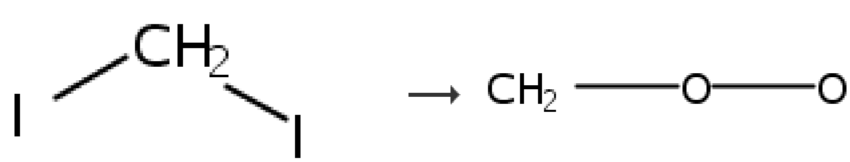
References

The gas-phase reaction of the methylperoxy radical with sulfur dioxide

By Cocks, Alan T. et al

From Atmospheric Environment (1967-1989), 20(12), 2359-66; 1986

13. 2 Steps



Overview

Steps/Stages

Notes

1.1 R:

2.1 R:O_2, 298K

1) UV light (285 nm and 340 nm) used, photochemical, 2) kinetic study, UV light (248 nm) used, photochemical, Reactants: 1, Reagents: 1, Steps: 2, Stages: 2, Most stages in any one step: 1

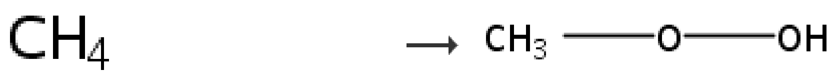
References

Rate coefficient of the reaction CH2OO + NO2 probed with a quantum-cascade laser near 11 µm

By Luo, Pei-Ling et al

From Physical Chemistry Chemical Physics, 21(32), 17578-17583; 2019

14. 2 Steps



Overview

Steps/Stages

1.1 R:N_2

R:

R:Cl_2

2.1 R:

Notes

1) GAS PHASE, PHOTOCHEM., HYDROGEN PEROXY RADICAL ALSO FORMED, METHANOL ALSO PRESENT IN REACTANT MIXTURE, 2) GAS PHASE, OXYGEN FORMED, Reactants: 1, Reagents: 4, Steps: 2, Stages: 2, Most stages in any one step: 1

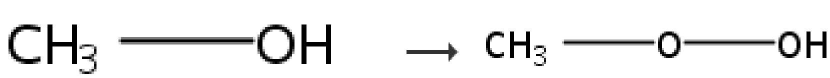
References

The temperature dependence of the rate constant for the hydroperoxy + methylperoxy gas-phase reaction

By Dagaut, Philippe et al

From Journal of Physical Chemistry, 92(13), 3833-6; 1988

15. 2 Steps



Overview

Steps/Stages

Notes

1.1 R:N_2

R:

R:Cl_2

2.1 R:

1) GAS PHASE, PHOTOCHEM., HYDROGEN PEROXY RADICAL ALSO FORMED, METHANE ALSO PRESENT IN REACTANT MIXTURE, 2) GAS PHASE, OXYGEN FORMED, Reactants: 1, Reagents: 4, Steps: 2, Stages: 2, Most stages in any one step: 1

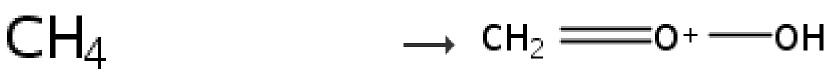
References

The temperature dependence of the rate constant for the hydroperoxy + methylperoxy gas-phase reaction

By Dagaut, Philippe et al

From Journal of Physical Chemistry, 92(13), 3833-6; 1988

16. Single Step



Overview

Steps/Stages

1.1 R:

Notes

Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

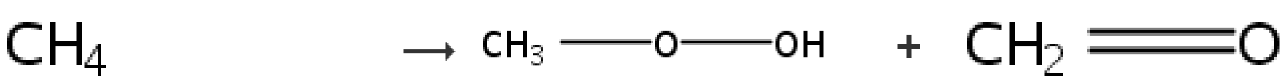
References

Chemistry and structure of the CH3O2+ product of the dioxygenyl ion-methane reaction

By Van Doren, J. M. et al

From Journal of Physical Chemistry, 90(12), 2772-7; 1986

17. Single Step



Overview

Steps/Stages

Notes

1.1 R:

R:H_2O_2, C:98-97-5, C:254449-04-2, S:MeCN, S:H_2O, 25°C, 1 atm; 6 h, 25°C, 90 bar

high pressure, Reactants: 1, Reagents: 2, Catalysts: 2, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Hydroperoxidation of methane and other alkanes with H2O2 catalyzed by a dinuclear iron complex and an amino acid

By Nizova, Galina V. et al

From Tetrahedron, 58(45), 9231-9237; 2002

18. Single Step

Overview

Steps/Stages

1.1 R:H_2, C:$Co_2(CO)_8$, S:H_2O, 5 h, 185°C, 280 bar

1.2 R:AcOH

R:

S:H_2O

1.3 R:H_2, C:Ni, 10 h, 125°C, 280 bar

Notes

autoclave used, Raney-nickel used as catalyst in stage 3, high pressure (in stages 1,3), thermal (in stage 1), Reactants: 2, Reagents: 3, Catalysts: 2, Solvents: 1, Steps: 1, Stages: 3, Most stages in any one step: 3

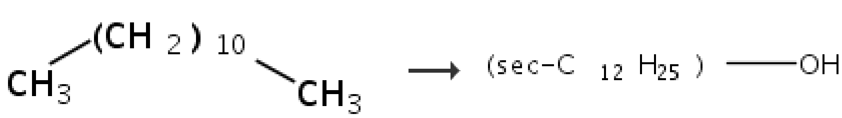
References

Plasticizer composition comprising polymeric dicarboxylic esters

By Pfeiffer, Matthias et al

From PCT Int. Appl., 2016026838, 25 Feb 2016

19. Single Step



Overview

Steps/Stages

1.1 R:

C:14871-92-2, 16 h, 140°C

Notes

other products also detected, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Process for oxidation of alkanes

By Deshpande, Raj M. et al

From U.S. Pat. Appl. Publ., 20060142620, 29 Jun 2006

Experimental Procedure

EXAMPLE-6 [**0041**] A 50 ml round bottom flask equipped with reflux condenser and thermowell was charged with 0.0171 mole decane and 8.018×10 5 mole $PdCl_2$Bipy. The $PdCl_2$Bipy complex was prepared using standard procedure as given in example-1 The round bottom flask was then flushed with O_2 and heated at 140° C. The reaction mixture was stirred for 16 hours using magnetic stirrer under oxygen blanket provided by a balloon under slightly positive pressure. At the end of reaction the, contents were cooled to room temperature. The reaction mixture was diluted with tetrahydrofuran and this solution was then analysed using gas chromatography Analysis of the reaction mixture showed 14.71% conversion of decant, with 32.04% selectivity to C10 ketones (decanones), and 39 22% selectivity to C10 secondary alcohols (secondary decanols).

20. Single Step

Overview

Steps/Stages

1.1 R:

C:14871-92-2, 16 h, 140°C

Notes

other products also detected, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Process for oxidation of alkanes

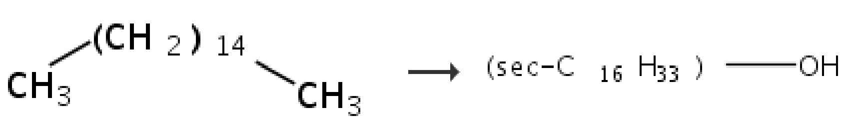
By Deshpande, Raj M. et al

From U.S. Pat. Appl. Publ., 20060142620, 29 Jun 2006

Experimental Procedure

EXAMPLE-5 [**0040**] A reaction was conducted to check recyclability of the catalyst. A 50 ml round bottom flask equipped with reflux condenser and thermowell was charged with 0 0171 mole hexadecane and 8.018×10 5 mole $PdCl_2$Bipy. The $PdCl_2$Bipy complex was prepared using standard procedure as given in example-1 The round bottom flask was then flushed with O_2 and heated at 140° C. The reaction mixture was stirred for 16 hours using magnetic stirrer under oxygen blanket provided by a balloon under slightly positive pressure. At the end of reaction the contents were cooled to room temperature. The catalyst was filtered and washed with pet ether (3×5 ml), and dried under vacuum. The reaction mixture was diluted with tetrahydrofuran and this solution was then analysed using gas chromatography. Analysis of the reaction mixture showed 17.28% conversion of hexadecane, with 36.65% selectivity to C16 ketones (hexadecanones), and 40 42% selectivity to C16 secondary alcohols (secondary hexadecanols). The catalyst filtered from reaction was taken in a 50 ml round bottom flask equipped with reflux condenser and thermowell. The round bottom flask was charged with 0.0171 mole hexadecane. The round bottom flask was then flushed with O_2 and heated at 140° C. The reaction mixture was stirred for 16 hours using magnetic stirrer under oxygen blanket provided by a balloon under slightly positive pressure. At the end of reaction the contents were cooled to room temperature. The reaction mixture was diluted with tetrahydrofuran and this solution was then analysed using gas chromatography. Analysis of the reaction mixture showed 19.23% conversion of hexadecane, with 33.34% selectivity to C16 ketones (hexadecanones), and 42.31% selectivity to C16 secondary alcohols (secondary hexadecanols).

21. Single Step



Overview

Steps/Stages

1.1 R:

C:14724-41-5, 16 h, 140°C

Notes

other products also detected, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Process for oxidation of alkanes

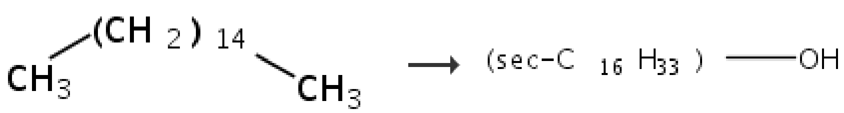
By Deshpande, Raj M. et al

From U.S. Pat. Appl. Publ., 20060142620, 29 Jun 2006

Experimental Procedure

EXAMPLE-4 [**0039**] A 50 ml round bottom flask equipped with reflux condenser and thermowell was charged with 0.0171 mole hexadecane and 8.018×10 mole $Pd(OAc)_2$Bipy. The round bottom flask was then flushed with O_2 and heated at 140° C. The reaction mixture was stirred is for 16 hours using magnetic stirrer under oxygen blanket provided by a balloon under slightly positive pressure. At the end of reaction the contents were cooled to room temperature The whole reaction mixture was diluted with tetrahydrofuran and this solution was then analysed using gas chromatography. Analysis of the reaction mixture showed 23.88% conversion of hexadecane, with 32.3% selectivity to C16 ketones (hexadecanones), and 39.4% selectivity to C16 secondary alcohols (secondary hexadecanols).

22. Single Step



Overview

Steps/Stages

1.1 R:

C:14871-92-2, 1200 psi; rt → 120°C; 120°C → 150°C; 150°C → 120°C; 120°C → rt

Notes

gas phase, high pressure, optimization study, other products also detected, thermal, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Process for oxidation of alkanes

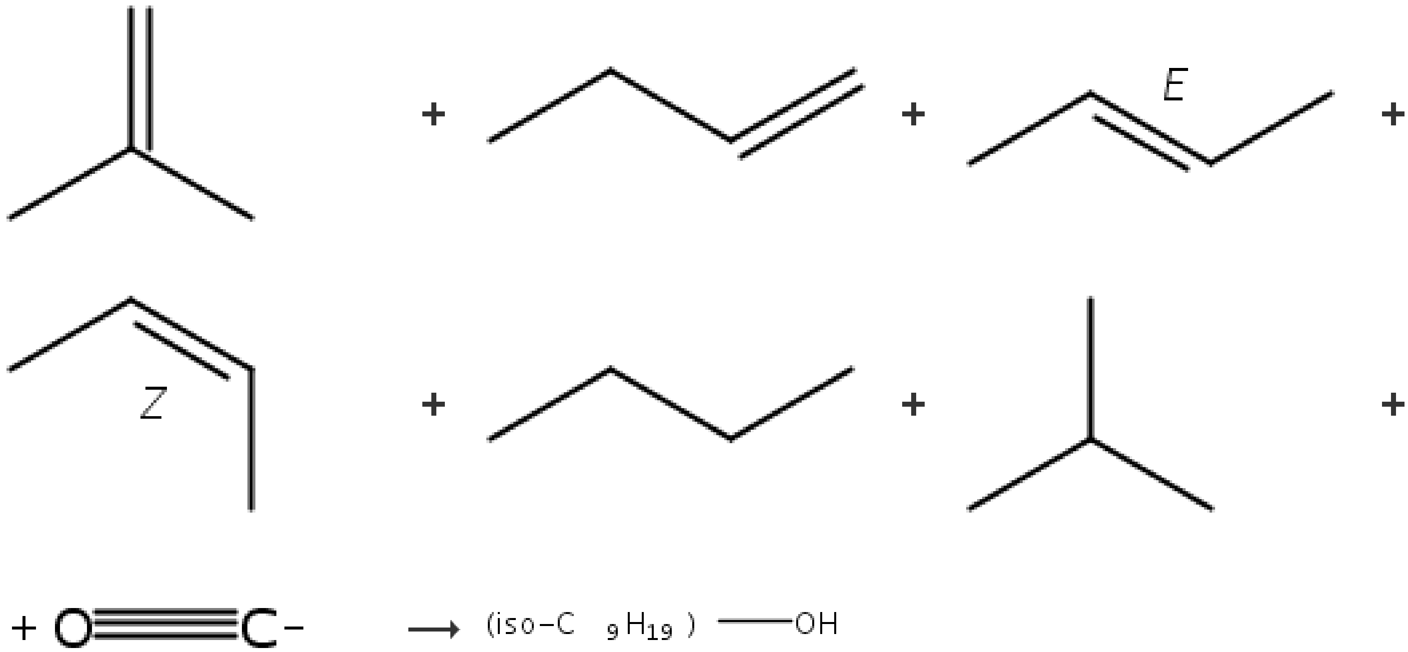
By Deshpande, Raj M. et al

From U.S. Pat. Appl. Publ., 20060142620, 29 Jun 2006

Experimental Procedure

EXAMPLE-13 [**0049**] A 50 ml autoclave equipped with magnetic stirrer, automatic temperature controller. The reactor was charged with 0.05 mole hexadecane and 1.60×10 4 mole $PdCl_2$Bipy. The $PdCl_2$Bipy complex was prepared using standard procedure as given in example-1. The reactor was flushed with 5% O_2 in N_2 and pressurized up to 1200 psig at room temperature. The reactor was then heated to 120° C. under stirring. The reactor temperature increased to 150° C. after attaining 120° C. temperature and then decreased to 120° C. gradually. The reactor was then cooled to room temperature and discharged after venting the gas. The reaction mixture was diluted with tetrahydrofuran and this solution was then analysed using gas chromatography Analysis of the reaction mixture showed 31.51% conversion of hexadecane, with 35.49% selectivity to C16 ketones (hexadecanones) and 54 86% selectivity to C16 secondary alcohols (secondary hexadecanols).

23. 2 Steps



[Step 2.1]

Overview

Steps/Stages

1.1 C:TiO_2, C:NiO, C:Al_2O_3, C:SiO_2, 38°C, 30 bar; 60°C, 30 bar

2.1 R:H_2, C:$Co_2(CO)_8$, S:H_2O, 5 h, 185°C, 280 bar

2.2 R:AcOH

R:

S:H_2O

2.3 R:H_2, C:Ni, 10 h, 125°C, 280 bar

Notes

1) raffinate II used as reactant source, high pressure, 2) autoclave used, Raney-nickel used as catalyst in stage 3, high pressure (in stages 1,3), thermal (in stage 1), Reactants: 7, Reagents: 3, Catalysts: 6, Solvents: 1, Steps: 2, Stages: 4, Most stages in any one step: 3

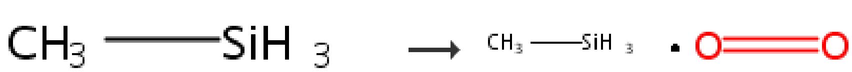
References

Plasticizer composition comprising polymeric dicarboxylic esters

By Pfeiffer, Matthias et al

From PCT Int. Appl., 2016026838, 25 Feb 2016

24. Single Step



reaction products with methane

Overview

Steps/Stages

Notes

1.1 R:O_2, S:CH_4 reaction products with monomethylsilane-ox

product depends on reaction conditions, Reactants: 1, Reagents: 1, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

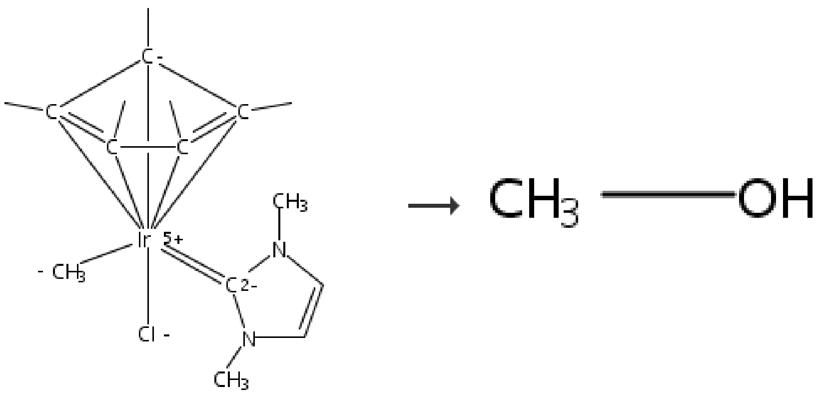
References

Hydrophilic films with long-term hydrophilicity and manufacture thereof

By Arakawa, Takami

From Jpn. Kokai Tokkyo Koho, 2012091352, 17 May 2012

25. Single Step



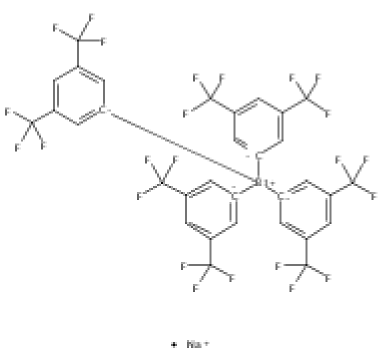
100%

Overview

Steps/Stages

1.1 R:

R:



S:EtOH, S:CH_2Cl_2, 30 min, rt

Experimental Procedure

General Procedure for Methanol Formation in CD_2Cl_2 from 1. In an ~3 mL Schlenk tube, **1** (7.1 mg, 0.015 mmol) was added to a solution containing 0.5 mL of 0.03 M 1,3,5-trimethoxybenzene in CD_2Cl_2 and 0.15 M ethanol. $NaBAr^F{}_4$ (26.6 mg, 0.03 mmol) was added to initiate the reaction. The solution was allowed to stir open to air for the allotted amount of time. The reaction was then removed from the stir plate, and the crude reaction mixture was then transferred to an NMR tube for ^1H NMR analysis.

Notes

alternative preparation shown, optimization study, Reactants: 1, Reagents: 2, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Oxyfunctionalization with Cp*IrIII(NHC)(Me)(Cl) with O2: Identification of a Rare Bimetallic IrIV μ-Oxo Intermediate

By Lehman, Matthew C. et al

From Journal of the American Chemical Society, 137(10), 3574-3584; 2015

26. Single Step

100%

Overview

Steps/Stages

1.1 R:

C:$MnSO_4$, 30 min, 553K

Notes

optimization study, fixed bed flow microreactor used, optimized on temperature, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

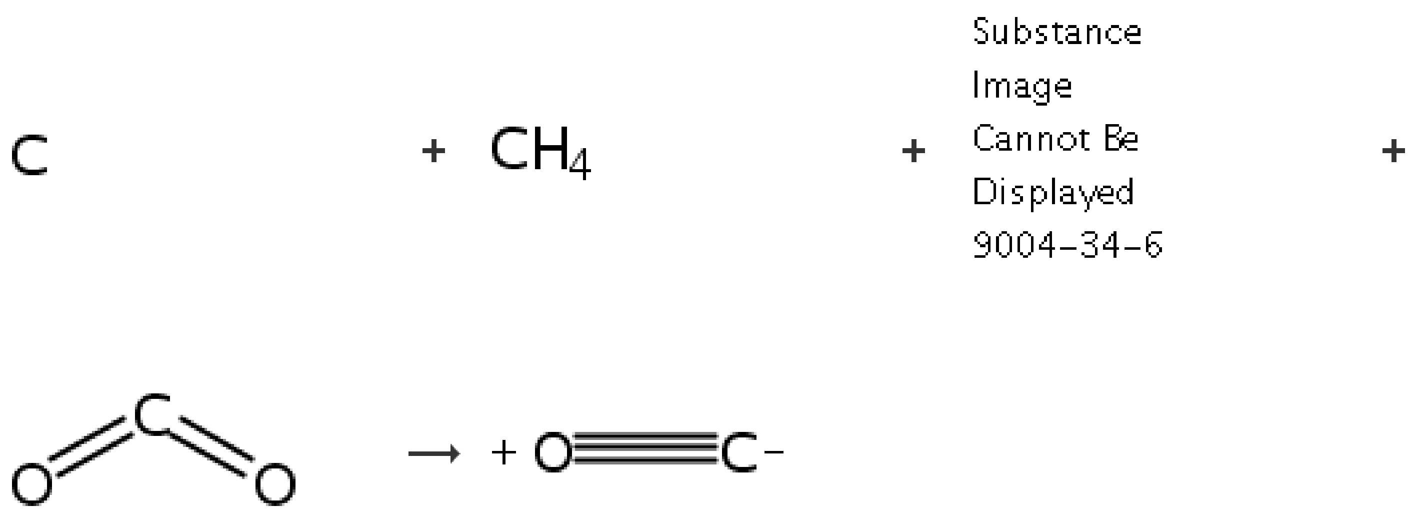
References

Taking advantage of a priori unwanted catalysts modifications

By Arendt, E. and Gaigneaux, E. M.

From Applied Catalysis, A: General, 474, 51-58; 2014

27. Single Step



100%

Overview

Steps/Stages

Notes

1.1 R:

900°C

solid-supported catalyst, thermal, quartz reactor tube used, syngas formed, Rh-Ce supported on alumina prepared and used as catalyst, Reactants: 4, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

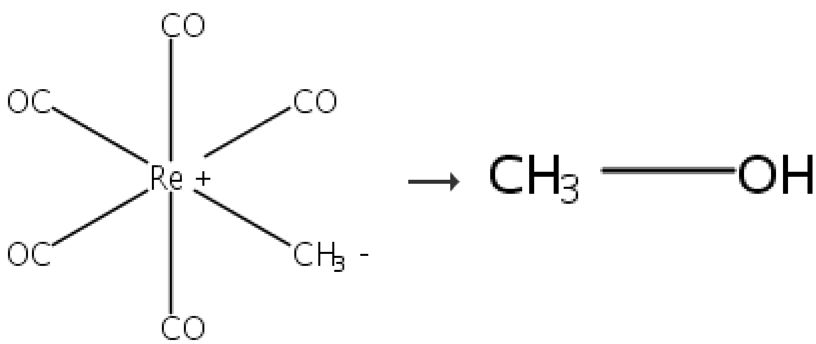
References

Improved utilization of biomass-derived carbon by co-processing with hydrogen-rich feedstocks in millisecond reactors

By Colby, Joshua L. et al

From Green Chemistry, 12(3), 378-380; 2010

28. Single Step



100%

Overview

Steps/Stages

1.1 R:SeO_2

R:

S:CD_3C.tbd.N, S:D_2O, 30 min, 100°C

Notes

optimization study, Reactants: 1, Reagents: 2, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Catalytic process for oxidative functionalization of methane by rhenium(I)-mediated carbon-hydrogen bond activation

By Periana, Roy A. et al

From PCT Int. Appl., 2009091918, 23 Jul 2009

Experimental Procedure

EXAMPLE 3. Reaction of CH3Re(CO)5 with H2SeO3 as oxidant. All reactions were carried out in 9:1 CD_3CN/D_2O in 8" NMR tubes equipped with a resealable J-Young Teflon valve. Approximately 30 mg (0.088 mmol) methyl rhenium(I) pentacarbonyl was charged to the NMR tube, followed by 1 equivalent of SeO_2 (9.76 mg, 0.088 mmol), followed by CD_3CN and D_2O (9:1, 0.7 mL added), along with 0.6 µl, of cyclohexane for use as an internal standard. All appropriate blanks were taken to assign solvent peaks, starting material peaks, and product (methanol) formation. Reactions were typically carried out under air at 100°C for 30 minutes. Yield of CH_3SeO_2H appeared quantitative by ^{1}H NMR. CH_3SeO_2H(D): ^{1}H NMR (9:1 CD_3CN/D_2O): δ 2.65(s, 3H, Se-CH_3, $^2J_{se\text{-}H}$ 13.2 Hz). ^{13}C{^{1}H} NMR (9:1 CD_3CN/D_2O): δ 42.2(Se-CH_3, $^1J_{se\text{-}H}$ 90.2 Hz).

29. Single Step

98%

Overview

Steps/Stages

1.1 R:

C:Al_2O_3, C:MgO, C:Ni, C:Au, 72 h, 900°C

Notes

gas phase, solid-supported catalyst, thermal, syngas formed, optimization study, optimized on catalyst, reaction temperature and time, 5%nickel-2%gold supported on alumina-magnesium oxide prepared and used as catalyst, Reactants: 1, Reagents: 1, Catalysts: 4, Steps: 1, Stages: 1, Most stages in any one step: 1

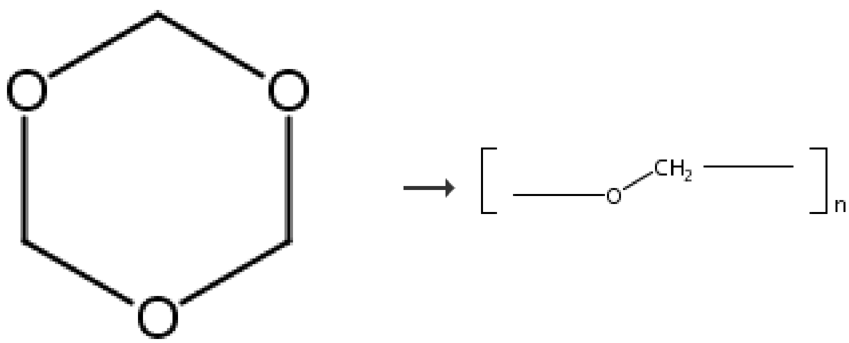
References

Effect of the chemical composition of (MgO)x(Al2O3)y support on the catalytic performance of Ni and Ni-Au catalysts for the partial oxidation of methane

By Maniecki, Tomasz P. et al

From Chemical Engineering Journal (Amsterdam, Netherlands), 154(1-3), 142-148; 2009

30. Single Step



92%

Overview

Steps/Stages

1.1 R:BF_3-Et_2O

R:

S:AcOEt, 80°C

Notes

optimization study, optimized on reagent and solvent, Reactants: 1, Reagents: 2, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Process of making an oxymethylene polymer using ester and Lewis acid for manufacture of a film, fiber or shaped article

By Heitz, Thomas et al

From PCT Int. Appl., 2018134075, 26 Jul 2018

31. Single Step

89%

Overview

Steps/Stages

1.1 R:

C:Al_2O_3, C:Ca, C:Ni, 20 h, 1023K

Notes

solid-supported catalyst, thermal, gas phase, hydrogen also formed as a by-product, syngas formed, stainless steel-tube fixed bed microreactor used, space velocity=19560 milliliter per hour per gram, alumina supported alkaline earth metal (calcium) modified nickel prepared by co-impregnation method and used as catalyst, optimization study, optimized on catalyst and reaction time, 97.7% conversion for CH4 and 72.1% conversion for CO2, Reactants: 2, Reagents: 1, Catalysts: 3, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Effect of different metal promoters on Ni-based catalyst for CO2 reforming and partial oxidation of methane to syngas

By Liu, Yuanfeng et al

From Asian Journal of Chemistry, 25(7), 4074-4076; 2013

32. Single Step

93%

Overview

Steps/Stages

Notes

1.1 R:

C:Ni, C:Au, 800°C

gas phase, solid-supported catalyst, Al2O3-Cr2O3 used as support, flow system used, optimization study, optimized on catalyst, Reactants: 1, Reagents: 1, Catalysts: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Physicochemical properties and catalytic activity of Al2O3-Cr2O3-supported Ni-Au catalysts for partial oxidation of methane

By Maniecki, Tomasz P. et al

From Przemysl Chemiczny, 86(9), 857-860; 2007

33. Single Step

88%

Overview

Steps/Stages

1.1 R:

C:Pt, C:Ru, C:Ce, C:Al_2O_3, 1173K

Notes

solid-supported catalyst, Pt-Ru supported on Ce-Al2O3 used as catalyst, Reactants: 1, Reagents: 1, Catalysts: 4, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Production of Synthesis-Gas on Low-Percentage Pt-, Ru- and Pt-Ru Catalysts

By Tungatarova, S. A. et al

From Topics in Catalysis, 53(15-18), 1285-1288; 2010

Experimental Procedure

Pt-Ru catalysts supported on 2% Ce/(Θ + α)-Al_2O_3 with 0.05, 0.1, 0.15, 0.2, 0.5 and 1.0% content of metals and various ratio of Pt and Ru have been prepared by incipient wetness on (Θ + α)-Al_2O_3 (100-200 µm, S = 57.7 m^2/g) from water solutions of salts with subsequent heating and reduction with H_2 + Ar at 623-1,023 K. Tests were carried out in a continuous flow quartz micro reactor by a literature technique [1]. Initial reaction mixture CH_4:O_2:Ar = 1.6:0.8:97.6 (%) supplied into reactor at 623-1,223 K and ζ = 2.3 x 10^{-3} - 5.7 x 10^{-3} s. Final product.

34. Single Step

79%

Overview

Steps/Stages

Notes

1.1 R:

C:Co, 60 min, 150°C

zeolite HZSM-5 supported cobalt used as catalyst, optimization study, optimized on time, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Direct synthesis of methanol by partial oxidation of methane with oxygen over cobalt modified mesoporous H-ZSM-5 catalyst

By Krisnandi, Yuni Krisyuningsih et al

From Indonesian Journal of Chemistry, 15(3), 263-268; 2015

35. Single Step

80%

Overview

Steps/Stages

1.1 R:

C:158847-66-6, S:H_2O, S:Me_2CO

Notes

Reactants: 1, Reagents: 1, Catalysts: 1, Solvents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Process and ruthenium catalysts for the oxidation of alkanes and aromatic hydrocarbons into alcohols and/or ketones

By Khan, Mirza M. T.

From U.S., 5347057, 13 Sep 1994

36. Single Step

65%

Overview

Steps/Stages

Notes

1.1 R:

C:13454-96-1, 160-180°C, 3.5-4.5 MPa

1.2 S:H_2O

yield depends on reaction conditions, Reactants: 1, Reagents: 1, Catalysts: 1, Solvents: 1, Steps: 1, Stages: 2, Most stages in any one step: 2

References

Nonclassical prospective methods of obtaining methanol and formaldehyde

By Michalkiewicz, Beata and Ziebro, Janusz

From Inzynieria Chemiczna i Procesowa, 25(3/4), 1973-1980; 2004

37. Single Step

55%

Overview

Steps/Stages

1.1 R:BCl_3

R:

163°C

Notes

other products also detected, gas phase, Reactants: 1, Reagents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Novel Method for the Oxidation of Aliphatic Hydrocarbons to Alcohols

By Kapralova, G. A. and Chaikin, A. M.

From Russian Journal of Physical Chemistry B, 12(5), 836-847; 2018

38. Single Step

Overview

Steps/Stages

1.1 R:

C:Ag, 20 min, 600-650°C, 0.14 MPa

Notes

low pressure, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

System and method for recycling dilute formaldehyde in paraformaldehyde production

By Meng, Weidong et al

From Faming Zhuanli Shenqing, 110041183, 23 Jul 2019

39. Single Step

Overview

Steps/Stages

1.1 R:9,10-Anthraquinone

R:

C:$CuCl_2$, C:*i*-BuOH, S:174899-83-3, 3 h, rt → 150°C, 1 MPa

Notes

high pressure autoclave used, alternative reaction conditions shown, green chemistry-catalyst, Reactants: 1, Reagents: 2, Catalysts: 2, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Method for C-H partial oxidation of alkane in ionic liquid

By Zhang, Zongchao and Huang, Tingyu

From Faming Zhuanli Shenqing, 109809966, 28 May 2019

40. Single Step

Overview

Steps/Stages

1.1 R:

60 min, 200°C, 1 atm

Notes

copper-exchanged ZSM-5 zeolite used as catalyst, Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Isothermal cyclic conversion of methane to methanol using copper-exchanged ZSM-5 zeolite materials under mild conditions

By Burnett, L. et al

From Applied Catalysis, A: General, 587, 117272; 2019

41. Single Step

Overview

Steps/Stages

1.1 R:

C:Cu, 30 min, 473K, 1.5 bar

Notes

autoclave used, omega Zeolite (MAZ-B) catalyst prepared and used, aerobic, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

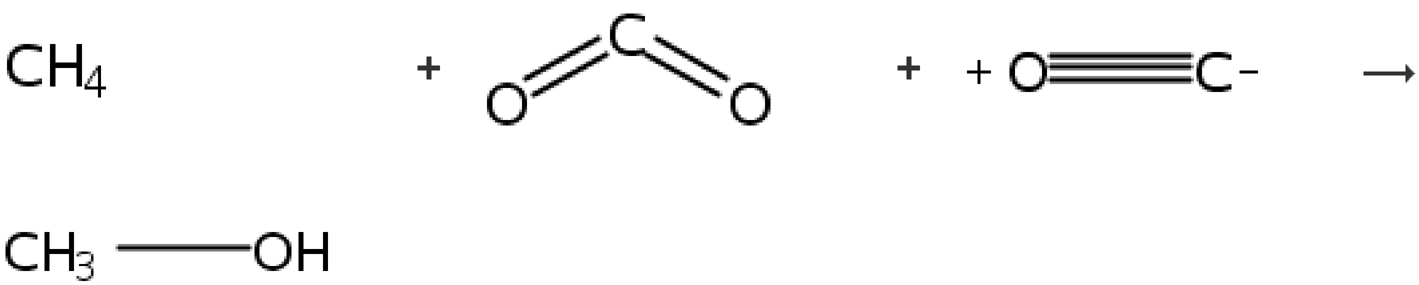
References

Comparative performance of Cu-zeolites in the isothermal conversion of methane to methanol

By Knorpp, Amy J. et al

From Chemical Communications (Cambridge, United Kingdom), 55(78), 11794-11797; 2019

42. Single Step



Overview

Steps/Stages

1.1 R:H_2

R:

5.5 MPa

Notes

gas phase, high pressure, Reactants: 3, Reagents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

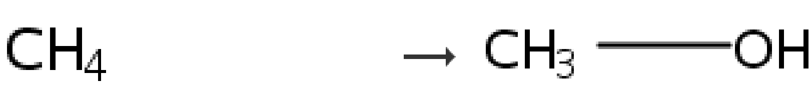
References

Method for producing methanol synthesis gas from gas generated in iron alloy smelting

By Da, Nashan et al

From Faming Zhuanli Shenqing, 109627134, 16 Apr 2019

43. Single Step



Overview

Steps/Stages

1.1 R:

C:$Cu(NO_3)_2$, 1.5 h, 423K, 50 mbar

Notes

copper-modified zeolite Na-ZSM-5 catalyst prepared and used, aerobic, alternative reaction conditions shown, solid-state NMR analysis used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

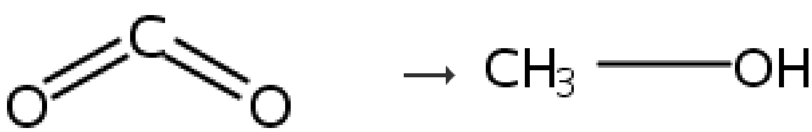
References

Mechanistic Insights on the Direct Conversion of Methane into Methanol over Cu/Na-ZSM-5 Zeolite: Evidence from EPR and Solid-State NMR

By Wu, Jian-Feng et al

From ACS Catalysis, 9(9), 8677-8681; 2019

44. Single Step



Overview

Steps/Stages

1.1 R:H_2

R:

S:H_2O, rt → 150°C; 150°C → 400°C; 400°C → 170°C, 4 MPa; 300°C, 3 MPa

Notes

high pressure, thermal, Reactants: 1, Reagents: 2, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

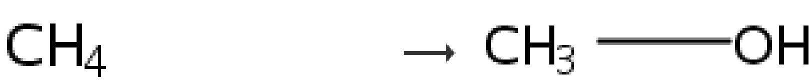
References

Device and method for production of methanol by direct steam reforming of coke oven waste gas

By Wang, Jianying et al

From Faming Zhuanli Shenqing, 109553508, 02 Apr 2019

45. Single Step



Overview

Steps/Stages

Notes

1.1 R:

C:1643442-00-5, 3 h, 700°C

hydrothermal, catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

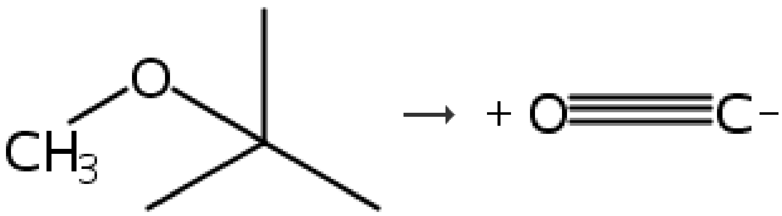
References

Copper-iridium composite oxide catalyst for methane oxidation to methanol and its preparation method

By Rui, Zebao et al

From Faming Zhuanli Shenqing, 110038591, 23 Jul 2019

46. Single Step



Overview

Steps/Stages

1.1 R:

1023-1447K, 3.5 atm; 1023-1447K, 12 atm

Notes

kinetic study, alternative preparation shown, shockt ube reactor used, alternate method may be used, other products also detected, high pressure, Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

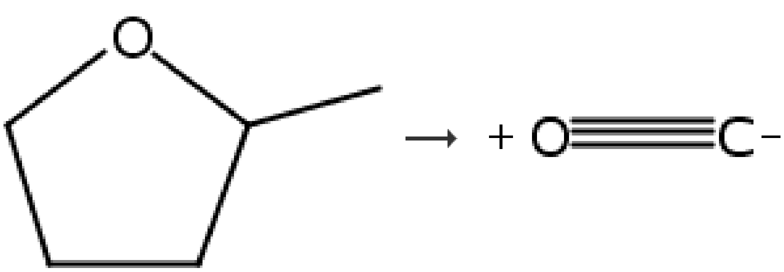
References

Shock tube investigation of methyl tert butyl ether and methyl tetrahydrofuran high-temperature kinetics

By Jouzdani, Shirin et al

From International Journal of Chemical Kinetics, 51(11), 848-860; 2019

47. Single Step



Overview

Steps/Stages

1.1 R:

1034-1403K, 3.3 atm; 1034-1403K, 12 atm

Notes

kinetic study, alternative preparation shown, shockt ube reactor used, alternate method may be used, other products also detected, high pressure, Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Shock tube investigation of methyl tert butyl ether and methyl tetrahydrofuran high-temperature kinetics

By Jouzdani, Shirin et al

From International Journal of Chemical Kinetics, 51(11), 848-860; 2019

48. Single Step

Overview

Steps/Stages

1.1 R:

C:Cu, 20 h, 723K, 35 atm

Notes

catalyst supported on modernite zeolite,optimization study (optimized on pressure, time and stoichiometry of catalyst),selectivity = 90%, high pressure, solid-supported catalyst, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Insights into the Speciation of Cu in the Cu-H-Mordenite Catalyst for the Oxidation of Methane to Methanol

By Brezicki, Gordon et al

From ACS Catalysis, 9(6), 5308-5319; 2019

49. Single Step

Overview

Steps/Stages

Notes

1.1 R:EDTA

R:

C:74506-37-9, 30°C

biotransformation, enzymic, described medium, DH-1 stock used, Reactants: 1, Reagents: 2, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Method for producing methanol from methane using methanotrophic bacteria without external reducing power

By Na, Jeong Geol et al

From Repub. Korean Kongkae Taeho Kongbo, 2019049573, 09 May 2019

50. Single Step

Overview

Steps/Stages

1.1 R:

C:Pt, 30 min, 200°C

Notes

platinum exchanged copper mordenite type zeolite catalyst prepared and used, alternate palladium exchanged copper mordenite type zeolite catalyst may be used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Increasing the activity of copper exchanged mordenite in the direct isothermal conversion of methane to methanol by Pt and Pd doping

By Tomkins, P. et al

From Chemical Science, 10(1), 167-171; 2019

Reaction Protocol

Procedure

1. Activate the material in a flow of oxygen and maintain the reactor at to 200°C.
2. Purge the reactor with helium and introduce methane at ambient pressure for 30 min.

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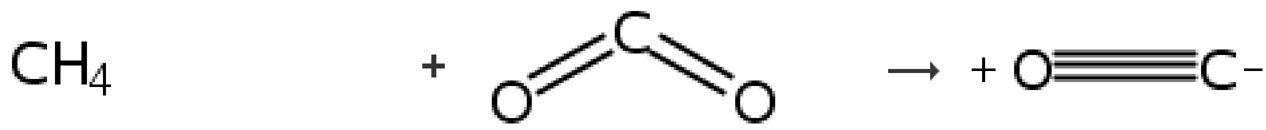
51. Single Step



Overview

Steps/Stages

1.1 R:

C:Ni

Notes

nickel supported mesoporous aluminum magnesium oxide catalyst prepared and used, hydrogen formed as byproduct, gas phase, solid-supported catalyst, Reactants: 2, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

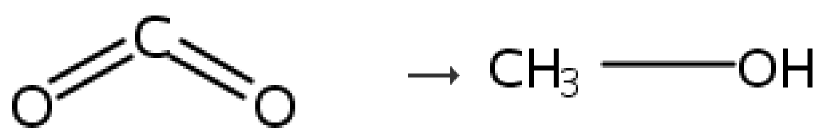
References

Mesoporous nanostructured Ni/MgAl2O4 catalysts: Highly active and stable catalysts for syngas production in combined dry reforming and partial oxidation

By Jalali, Ramin et al

From International Journal of Hydrogen Energy, 44(21), 10427-10442; 2019

52. Single Step



Overview

Steps/Stages

1.1 R:

C:Pt, 3 h, 30°C, 1 atm

Notes

electrochemical, steel plate used as a electrode,dielectric barrier discharge plasma reactor used,conversion =37%,selectivity =62.6%,Pt film supported In2O3 catalyst prepared and used,alternate reaction conditions also shown, gas phase, solid-supported catalyst, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Highly dispersed Pt-based catalysts for selective CO2 hydrogenation to methanol at atmospheric pressure

By Men, Yu-Long et al

From Chemical Engineering Science, 200, 167-175; 2019

53. Single Step

Overview

Steps/Stages

1.1 R:

C:154769-61-6, C:189619-69-0, rt

Notes

carbon nitride decorated cesium tungstate nanocomposite catalyst prepared and used,Xe lamp used,reaction carried out under air, photochemical, Reactants: 1, Reagents: 1, Catalysts: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Selective Photocatalytic Oxidation of Low Concentration Methane over Graphitic Carbon Nitride-Decorated Tungsten Bronze Cesium

By Li, Yuan et al

From ACS Sustainable Chemistry & Engineering, 7(4), 4382-4389; 2019

54. Single Step

Overview

Steps/Stages

1.1 R:

C:Al_2O_3, C:PdO, 250°C

Notes

Reactants: 1, Reagents: 1, Catalysts: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Surface reaction kinetics of methane oxidation over PdO

By Stotz, H. et al

From Journal of Catalysis, 370, 152-175; 2019

55. Single Step

Overview

Steps/Stages

1.1 R:

C:2288816-94-2, 850-950°C, 2 atm

Notes

fixed bed quartz reactor used, aerobic, alternative reaction conditions shown, catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Trimetallic NiCoM catalysts (M = Mn, Fe, Cu) for methane conversion into synthesis gas

By Zagaynov, Igor V. et al

From Mendeleev Communications, 29(1), 22-24; 2019

Reaction Protocol

Procedure 1. Perform the partial oxidation and dry reforming of methane using a single-pass plug-flow setup including a flow-fixed bed quartz reactor.
2. Equip the reactor with a pocket for a thermocouple.

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56. Single Step

Overview

Steps/Stages

1.1 R:

C:2288816-93-1, 850-950°C, 2 atm

Notes

fixed bed quartz reactor used, aerobic, alternative reaction conditions shown, catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Trimetallic NiCoM catalysts (M = Mn, Fe, Cu) for methane conversion into synthesis gas

By Zagaynov, Igor V. et al

From Mendeleev Communications, 29(1), 22-24; 2019

Reaction Protocol

Procedure 1. Perform the partial oxidation and dry reforming of methane using a single-pass plug-flow setup including a flow-fixed bed quartz reactor.
2. Equip the reactor with a pocket for a thermocouple.

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57. Single Step

Overview

Steps/Stages

1.1 R:

C:2288816-92-0, 850-950°C, 2 atm

Notes

fixed bed quartz reactor used, aerobic, alternative reaction conditions shown, catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Trimetallic NiCoM catalysts (M = Mn, Fe, Cu) for methane conversion into synthesis gas

By Zagaynov, Igor V. et al

From Mendeleev Communications, 29(1), 22-24; 2019

Reaction Protocol

Procedure 1. Perform the partial oxidation and dry reforming of methane using a single-pass plug-flow setup including a flow-fixed bed quartz reactor.
2. Equip the reactor with a pocket for a thermocouple.

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58. Single Step

Overview

Steps/Stages

1.1 R:

C:497233-26-8, 850-950°C, 2 atm

Notes

fixed bed quartz reactor used, aerobic, alternative reaction conditions shown, catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Trimetallic NiCoM catalysts (M = Mn, Fe, Cu) for methane conversion into synthesis gas

By Zagaynov, Igor V. et al

From Mendeleev Communications, 29(1), 22-24; 2019

Reaction Protocol

Procedure 1. Perform the partial oxidation and dry reforming of methane using a single-pass plug-flow setup including a flow-fixed bed quartz reactor.
2. Equip the reactor with a pocket for a thermocouple.

View more...

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59. Single Step

Overview

Steps/Stages

1.1 R:

C:2288816-91-9, 850-950°C, 2 atm

Notes

fixed bed quartz reactor used, aerobic, alternative reaction conditions shown, catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Trimetallic NiCoM catalysts (M = Mn, Fe, Cu) for methane conversion into synthesis gas

By Zagaynov, Igor V. et al

From Mendeleev Communications, 29(1), 22-24; 2019

Reaction Protocol

Procedure 1. Perform the partial oxidation and dry reforming of methane using a single-pass plug-flow setup including a flow-fixed bed quartz reactor.
2. Equip the reactor with a pocket for a thermocouple.

View more...

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MethodsNow

60. Single Step

Overview

Steps/Stages

1.1 R:

C:2288816-90-8, 850-950°C, 2 atm

Notes

fixed bed quartz reactor used, aerobic, alternative reaction conditions shown, catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Trimetallic NiCoM catalysts (M = Mn, Fe, Cu) for methane conversion into synthesis gas

By Zagaynov, Igor V. et al

From Mendeleev Communications, 29(1), 22-24; 2019

Reaction Protocol

Procedure

1. Perform the partial oxidation and dry reforming of methane using a single-pass plug-flow setup including a flow-fixed bed quartz reactor.
2. Equip the reactor with a pocket for a thermocouple.

View more...

View with
MethodsNow

61. Single Step

Overview

Steps/Stages

Notes

1.1 R:

C:1801747-45-4, 850-950°C, 2 atm

fixed bed quartz reactor used, aerobic, alternative reaction conditions shown, catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Trimetallic NiCoM catalysts (M = Mn, Fe, Cu) for methane conversion into synthesis gas

By Zagaynov, Igor V. et al

From Mendeleev Communications, 29(1), 22-24; 2019

Reaction Protocol

Procedure 1. Perform the partial oxidation and dry reforming of methane using a single-pass plug-flow setup including a flow-fixed bed quartz reactor.
2. Equip the reactor with a pocket for a thermocouple.

View more...

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62. Single Step

Overview

Steps/Stages

1.1 R:

Notes

Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Highly abrasion-resistant silicone oil coating and preparation method thereof

By Cao, Yu

From Faming Zhuanli Shenqing, 109161335, 08 Jan 2019

63. Single Step

Overview

Steps/Stages

1.1 R:

R:H_2O, C:10045-86-0, 200-500°C

Notes

Reactants: 1, Reagents: 2, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Application of Mossbauer spectroscopy in industrial heterogeneous catalysis: effect of oxidant on FePO4 material phase transformations in direct methanol synthesis from methane

By Dasireddy, Venkata D. B. C. et al

From Hyperfine Interactions, 238(1), 1-9; 2017

64. Single Step

Overview

Steps/Stages

1.1 R:H_2O_2

R:

C:1436512-81-0, C:SiO_2, C:Al, S:MeCN, 3 h, rt

Notes

solid-supported catalyst, reuseable catalyst used, CuEthp@AlMSN30-ex catalyst prepared and used, Reactants: 1, Reagents: 2, Catalysts: 3, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Heterogeneous formulation of the tricopper complex for efficient catalytic conversion of methane into methanol at ambient temperature and pressure

By Liu, Chih-Cheng et al

From Energy & Environmental Science, 9(4), 1361-1374; 2016

65. Single Step

Overview

Steps/Stages

Notes

1.1 R:H_2O_2
R:

C:1430342-14-5, C:SiO_2, C:Al, S:MeCN, 3 h, rt

solid-supported catalyst, CuEtp@AlMSN30-ex catalyst prepared and used, reuseable catalyst used, Reactants: 1, Reagents: 2, Catalysts: 3, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Heterogeneous formulation of the tricopper complex for efficient catalytic conversion of methane into methanol at ambient temperature and pressure

By Liu, Chih-Cheng et al

From Energy & Environmental Science, 9(4), 1361-1374; 2016

66. Single Step

Overview

Steps/Stages

1.1 R:H_2O_2
R:

C:1436512-81-0, C:SiO_2, S:MeCN, 3 h, rt

Notes

solid-supported catalyst, CuEthp@MSN-TP catalyst prepared and used, reuseable catalyst used, Reactants: 1, Reagents: 2, Catalysts: 2, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Heterogeneous formulation of the tricopper complex for efficient catalytic conversion of methane into methanol at ambient temperature and pressure

By Liu, Chih-Cheng et al

From Energy & Environmental Science, 9(4), 1361-1374; 2016

67. Single Step

Overview

Steps/Stages

Notes

1.1 R:H_2O_2

R:

C:1430342-14-5, C:SiO_2, S:MeCN, 3 h, rt

solid-supported catalyst, CuEtp@MSN-TP catalyst prepared and used, reuseable catalyst used, Reactants: 1, Reagents: 2, Catalysts: 2, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Heterogeneous formulation of the tricopper complex for efficient catalytic conversion of methane into methanol at ambient temperature and pressure

By Liu, Chih-Cheng et al

From Energy & Environmental Science, 9(4), 1361-1374; 2016

68. Single Step

Overview

Steps/Stages

1.1 R:

C:SiO_2, C:Cu

Notes

zeolite support used, solid-supported catalyst, Reactants: 1, Reagents: 1, Catalysts: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Copper-modified zeolites and silica for conversion of methane to methanol

By Wang, Xueting et al

From Catalysts, 8(11), 545/1-545/10; 2018

69. Single Step

Overview

Steps/Stages

Notes

1.1 R:Na ascorbate, C:1430342-13-4, C:SiO_2, S:H_2O, S:MeCN, rt

1.2 R:

10 min, rt, 2.44 atm

1.3 R:H_2O_2, S:H_2O, 3 h, rt

copper complex supported on mesoporous silica nanoparticle catalyst prepared and used, reusable catalyst, in-situ generated catalyst in stage, solid-supported catalyst, Reactants: 1, Reagents: 3, Catalysts: 2, Solvents: 2, Steps: 1, Stages: 3, Most stages in any one step: 3

References

Catalytic Oxidation of Light Alkanes Mediated at Room Temperature by a Tricopper Cluster Complex Immobilized in Mesoporous Silica Nanoparticles

By Liu, Chih-Cheng et al

From ACS Sustainable Chemistry & Engineering, 6(4), 5431-5440; 2018

70. Single Step

Overview

Steps/Stages

1.1 R:NaOH

R:

Notes

electrolytic cell used, Reactants: 1, Reagents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

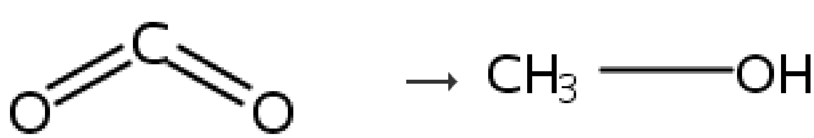
References

Preparation method of octamethyl cyclotetrasiloxane by using liquid methane

By Cao, Yu

From Faming Zhuanli Shenqing, 109096322, 28 Dec 2018

71. Single Step



Overview

Steps/Stages

Notes

1.1 R:H_2

R:

150°C, 1.23 MPa

alternate reaction conditions may be used, high pressure, Reactants: 1, Reagents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Methanol production from water-splitting process and plant process

By Johnson, Justin R. et al

From PCT Int. Appl., 2018232060, 20 Dec 2018

72. Single Step

Overview

Steps/Stages

1.1 R:

C:$Cu(NO_3)_2$, C:SiO_2, C:Al_2O_3, C:Na_2O, 723K → 473K, 30 bar; 15 min, 473K

1.2 30 min, 473K

Notes

selective reaction, autoclave used, catalyst prepared and used, high pressure, solid-supported catalyst (Copper-Exchanged Omega (MAZ) Zeolite used as catalyst), Reactants: 1, Reagents: 1, Catalysts: 4, Steps: 1, Stages: 2, Most stages in any one step: 2

References

Copper-Exchanged Omega (MAZ) Zeolite: Copper-concentration Dependent Active Sites and its Unprecedented Methane to Methanol Conversion

By Knorpp, Amy J. et al

From ChemCatChem, 10(24), 5593-5596; 2018

Reaction Protocol

Procedure

1. Sieve zeolite samples to 150-250µm.
2. Load 0.5 grams of samples into stainless steel autoclave (Premex Reactor Ag).

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73. Single Step

Overview

Steps/Stages

1.1 R:

C:Cu, 150°C → 500°C; 480 min, 500°C; 500°C → 200°C

1.2 360 min, 200°C

Notes

Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 2, Most stages in any one step: 2

References

The Nuclearity of the Active Site for Methane to Methanol Conversion in Cu-Mordenite: A Quantitative Assessment

By Pappas, Dimitrios K. et al

From Journal of the American Chemical Society, 140(45), 15270-15278; 2018

Reaction Protocol

Procedure 1. Evaluate Cu-MOR zeolites with respect to the activity towards the MTM conversion in a quartz plug flow reactor (ID = 6 mm).
2. Control the temperature by a tubular oven monitored by a thermocouple placed in the center of the bed.

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74. Single Step

Overview

Steps/Stages

1.1 R:

C:13446-18-9, C:7784-27-2, C:10139-58-9, C:58719-23-6, 50 h, 750°C

Notes

exothermic, aerobic, solid-supported catalyst (Rh nanoparticles supported on Rh/Mg/Al hydrotalcite-type catalyst prepared and used), Reactants: 1, Reagents: 1, Catalysts: 4, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Coprecipitated-like hydrotalcite-derived coatings on open-cell metallic foams by electrodeposition: Rh nanoparticles on oxide layers stable under harsh reaction conditions

By Ho, Phuoc Hoang et al

From Applied Catalysis, A: General, 560, 12-20; 2018

75. Single Step

Overview

Steps/Stages

1.1 R:AcONa, R:$Cu(NO_3)_2$

R:

400°C; 30 min, 200°C, 7 bar

Notes

aerobic oxidation,CuMOR prepared and used,alternate reaction conditions also shown,selectivity = 98%, Reactants: 1, Reagents: 3, Steps: 1, Stages: 1, Most stages in any one step: 1

References

The Effect of the Active-Site Structure on the Activity of Copper Mordenite in the Aerobic and Anaerobic Conversion of Methane into Methanol

By Sushkevich, Vitaly L. et al

From Angewandte Chemie, International Edition, 57(29), 8906-8910; 2018

Reaction Protocol

Procedure

1. Calcine CuMOR in a flow of oxygen (50 ml/min) at 673K and 1 bar for 1 h with heating rate of 5K/min for oxygen pre-treatment.
2. Activatee, introduce a helium flow of 40 ml/min for 20 min to remove the traces of oxygen and water at 673K and cool the sample to 473K with the rate of 10K/min.

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76. Single Step

Overview

Steps/Stages

Notes

1.1 R:

C:Ni, C:CeO_2, S:H_2O, 450K, 4 Torr

Reactants: 1, Reagents: 1, Catalysts: 2, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Direct Conversion of Methane to Methanol on Ni-Ceria Surfaces: Metal-Support Interactions and Water-Enabled Catalytic Conversion by Site Blocking

By Lustemberg, Pablo G. et al

From Journal of the American Chemical Society, 140(24), 7681-7687; 2018

Reaction Protocol

Procedure 1. Transfer the sample in vacuo to the micro reactor at room temperature.
2. Introduce the hydrocarbon (1 Torr) to the micro reactor.

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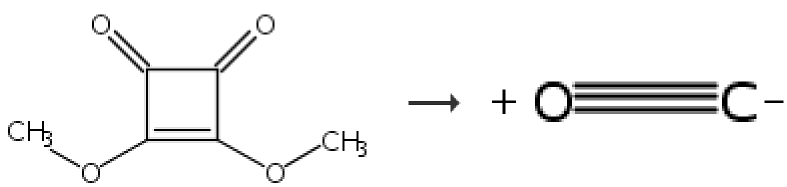
77. Single Step



Overview

Steps/Stages

1.1 R:$Cu(OAc)_2$, R:PhC.tbd.CPh, R:K_2CO_3

R:

C:52462-29-0, C:$Ph_2P(CH_2)_3PPh_2$, S:$HOCMe_2Et$, 8 h, 90°C

Notes

reaction carried out under air,reactant also recovered as product, Reactants: 1, Reagents: 4, Catalysts: 2, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Ru(II)-Catalyzed C-H Activation and Annulation Reaction via Carbon-Carbon Triple Bond Cleavage

By Prakash, Rashmi et al

From Organic Letters, 20(8), 2297-2300; 2018

Reaction Protocol

Procedure 1. Stir a mixture of 2-phenyl-2,3-dihydrophthalazine-1,4-dione derivative (60 mg), alkyne (52 mg), $[RuCl_2(p\text{-cymene})]_2$ (5.0 mol%), K_2CO_3 (0.25 mmol), $Cu(OAc)_2 \cdot H_2O$ (0.25 mmol) and 1,3-bis(diphenylphosphino)propane (10.0 mol%) in ^{t}AmOH (4.0 mL) at 90 °C under open air for 8 hours.
2. Remove the solvent under vacuo.

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78. Single Step

Overview

Steps/Stages

1.1 R:

C:12271-42-0, C:$Cu(NO_3)_2$, C:$Cu(OAc)_2$, 4 h, 550°C; 550°C → 200°C

1.2 30 min, 200°C

Notes

fixed bed reactor used, catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 3, Steps: 1, Stages: 2, Most stages in any one step: 2

References

Comparative Study of Diverse Copper Zeolites for the Conversion of Methane into Methanol

By Park, Min Bum et al

From ChemCatChem, 9(19), 3705-3713; 2017

Reaction Protocol

Procedure 1. Conduct the reaction of methane-to-methanol under atmospheric pressure in a continuous-flow fixed-bed micro reactor containing about 0.5 gofa copper-loaded zeolite sieve fraction.
2. Activate each catalyst in a flow of pure oxygen (30 mL min $^{-1}$) by heating to obtain temperature (200, 350, 450, or 550 °C) at aramping rate of 1 ° C min $^{-1}$, keep at the obtain temperature for 4h.

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79. Single Step

Overview

Steps/Stages

Notes

1.1 R:CO_2

R:

R:H_2, C:Ni, C:La_2O_3, 720°C, 1 atm

Reactants: 1, Reagents: 3, Catalysts: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

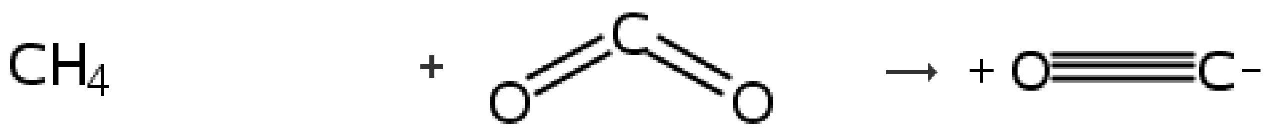
References

Oxidative conversion of hydrocarbon feed to olefins, aromatic hydrocarbons, lower paraffins and syngas

By Mamedov, Aghaddin

From PCT Int. Appl., 2017085626, 26 May 2017

80. Single Step



Overview

Steps/Stages

1.1 R:

C:Ni, C:La_2O_3, 710°C

Notes

H2 obtained as product, Reactants: 2, Reagents: 1, Catalysts: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

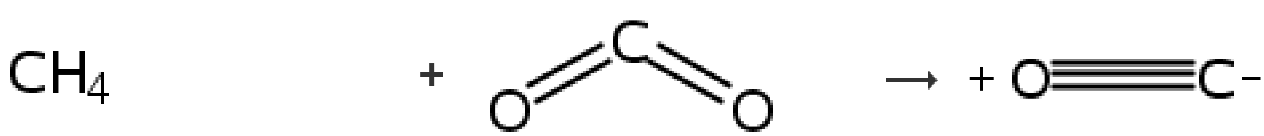
References

Two-step process of CO2 assisted oxidative conversion of methane to syngas and methane assisted conversion of syngas to olefins

By Mamedov, Aghaddin

From PCT Int. Appl., 2017093859, 08 Jun 2017

81. Single Step



Overview

Steps/Stages

Notes

1.1 R:Ce

R:

(reactive species), C:Ni, C:SiO_2, 750°C

hydrogen also formed as a by-product, fixed-bed reactor used, nickel nanoparticles supported on silica catalyst prepared and used, solid-supported catalyst, Reactants: 2, Reagents: 2, Catalysts: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

In situ preparation of Ni nanoparticles in cerium-modified silica aerogels for coking- and sintering-resistant dry reforming of methane

By Zhao, Xiaoyuan et al

From New Journal of Chemistry, 41(12), 4869-4878; 2017

Reaction Protocol

Procedure 1. Observe the performance of dry reforming of methane in a fixed-bed reactor with a quartz tube (8 mm internal diameter).
2. Load a small amount of catalyst (0.15 g, 40-60 mesh) was loaded into the quartz tube.

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82. Single Step

Overview

Steps/Stages

1.1 R:H_2

R:

rt → 430°C; 430°C → 600°C, 2.48 MPa

Notes

aerobic, Reactants: 1, Reagents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Enzymatic production of carbohydrates from dihydroxyacetone

By Milan, Jay L. and Mannan, Ramasamy Mannar

From PCT Int. Appl., 2016201110, 15 Dec 2016

83. Single Step

Overview

Steps/Stages

1.1 R:

C:Pt, 25°C

Notes

supported on titanium dioxide nanobelt, Pt/TiNB-ac catalyst prepared and used, water vapor used, reaction carried out with various catalyst, conversion, 91%, water also formed as a by product, solid-supported catalyst, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Acid-treated TiO2 nanobelt supported platinum nanoparticles for the catalytic oxidation of formaldehyde at ambient conditions

By Cui, Weiyi et al

From Applied Surface Science, 411, 105-112; 2017

84. Single Step

Overview

Steps/Stages

1.1 R:

rt → 200°C; 13 h, 200°C, 36 bar

1.2 -15°C

Notes

autoclave used, high pressure in stage 1, Cu zeolite catalyst activated at 450 degree Celisius used in stage 1, purging with helium in stage 2, gas phase, Reactants: 1, Reagents: 1, Steps: 1, Stages: 2, Most stages in any one step: 2

References

Direct Conversion of Methane to Methanol under Mild Conditions over Cu-Zeolites and beyond

By Tomkins, Patrick et al

From Accounts of Chemical Research, 50(2), 418-425; 2017

85. Single Step

Overview

Steps/Stages

1.1 R:

C:Cu, 200°C, 6 bar

Notes

optimized on catalyst, optimized on pressure, optimized on temperature, copper mordenite used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

A process for methane to methanol conversion at low temperature

By Ranocchiari, Marco et al

From PCT Int. Appl., 2016177542, 10 Nov 2016

86. Single Step

Overview

Steps/Stages

1.1 R:

C:Na_2WO_4, C:Mn, C:SiO_2, 1073K

Notes

catalyst prepared and used, Reactants: 1, Reagents: 1, Catalysts: 3, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Investigation of the surface reaction network of the oxidative coupling of methane over Na2WO4/Mn/SiO2 catalyst by temperature programmed and dynamic experiments

By Fleischer, Vinzenz et al

From Journal of Catalysis, 341, 91-103; 2016

87. Single Step

Overview

Steps/Stages

Notes

1.1 R:

C:Cu, 1 h, 450°C; 450°C → 200°C

1.2 8 h, 200°C

Cu/ZSM-5 Zeolite used as catalyst, catalyst prepared and used, selective oxidation, other products also detected, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 2, Most stages in any one step: 2

References

Effect of Location and Distribution of Al Sites in ZSM-5 on the Formation of Cu-Oxo Clusters Active for Direct Conversion of Methane to Methanol

By Markovits, Monica A. C. et al

From Topics in Catalysis, 59(17-18), 1554-1563; 2016

Reaction Protocol

Procedure 1. Activate the 0.1 g of Cu/ZSM-5 (250-400 lm) by calcination in pure O_2 flow (16 ml/min) at 450 °C for 1 hour.
2. Cool the activated sample to 200 °C in O_2 and flush in He.

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88. Single Step

Overview

Steps/Stages

1.1 R:

C:$Cu(OAc)_2$ exchange products with mordenite zeolite, C:CuCl exchange products with mordenite zeolite, 30 min, 200°C

Notes

copper mordenite catalyst prepared and used, recyclable catalyst, aerobic, optimization study, optimized on catalyst, alternative reaction conditions shown, Reactants: 1, Reagents: 1, Catalysts: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Methane to methanol over copper mordenite: yield improvement through multiple cycles and different synthesis techniques

By Bozbag, Selmi E. et al

From Catalysis Science & Technology, 6(13), 5011-5022; 2016

89. Single Step

Overview

Steps/Stages

1.1 R:

C:Ni, 970-1170K

Notes

reactant and air preheated at 600k before use, syngas generator used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Systems and methods for manufacture of methanol from natural gas and flare gas feedstock

By Zubrin, Robert M. et al

From U.S. Pat. Appl. Publ., 20160159714, 09 Jun 2016

90. Single Step

Overview

Steps/Stages

1.1 R:

1-24 h, rt → 260°C, 2-12 atm

Notes

high pressure, gas phase, high pressure reactor used, ligands grafted with SBA and transition metals used as catalyst, catalyst prepared and used, Reactants: 1, Reagents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

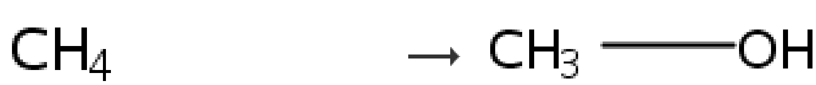
References

Silica matrix-supported low-temperature manufacture of methanol by direct oxidation of methane

By Elgammal, Ramez

From PCT Int. Appl., 2016043736, 24 Mar 2016

91. Single Step



Overview

Steps/Stages

1.1 R:

C:Cu, 323-473K

Notes

solid-supported catalyst, zeolite support used, other reagent (N2O) may also be used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Theoretical Insights into the Selective Oxidation of Methane to Methanol in Copper-Exchanged Mordenite

By Zhao, Zhi-Jian et al

From ACS Catalysis, 6(6), 3760-3766; 2016

92. Single Step

Overview

Steps/Stages

1.1 C:$CuCl_2$, C:Cu, S:D_2O, 10 min, rt, pH 7

1.2 R:

1 h, rt

1.3 1 h, rt

Notes

in-situ generated catalyst in stage 1, Reactants: 1, Reagents: 1, Catalysts: 2, Solvents: 1, Steps: 1, Stages: 3, Most stages in any one step: 3

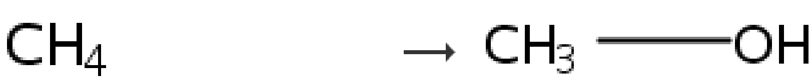
References

Tetrapeptide copper catalysts capable of oxidizing hydrocarbons at room temperature

By Singh, Gurdial and Nicholas-Lewis, Latisha Candice

From U.S. Pat. Appl. Publ., 20160060292, 03 Mar 2016

93. Single Step



Overview

Steps/Stages

Notes

1.1 R:

C:Cu

solid-supported catalyst, zeolite support used (ZSM-5), Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Stability and reactivity of copper oxo-clusters in ZSM-5 zeolite for selective methane oxidation to methanol

By Li, Guanna et al

From Journal of Catalysis, 338, 305-312; 2016

94. Single Step

Overview

Steps/Stages

1.1 R:CO

R:

Notes

Reactants: 1, Reagents: 2, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Method for producing high-efficiency methanol capable of reducing emission of carbon dioxide

By Jun, Ki Won et al

From PCT Int. Appl., 2016021836, 11 Feb 2016

95. Single Step

Overview

Steps/Stages

Notes

1.1 R:

C:Cu, 1 h, 450°C; 450°C → 200°C; 4 h, 200°C; 200°C → 135°C

solid-supported catalyst, catalyst prepared and used, mordenite-type zeolite support used, recyclable catalyst used, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Single-site trinuclear copper oxygen clusters in mordenite for selective conversion of methane to methanol

By Grundner, Sebastian et al

From Nature Communications, 6, 7546pp.; 2015

96. Single Step

Overview

Steps/Stages

1.1 R:SO_2

R:

C:CuO, C:NiO, C:CeO_2, C:ZrO_2, C:Y_2O_3, C:Pt, 800°C

Notes

solid-supported catalyst, optimization study, optimized on catalyst, copper oxide and nickel oxide supported on yttrium oxide and zirconia used, Reactants: 1, Reagents: 2, Catalysts: 6, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Effect of the composition and structural and size characteristics of composites based on stabilized zirconia and transition metal (Cu, Co, Ni) oxides on their catalytic properties in methane oxidation reactions

By Orlyk, S. N. and Shashkova, T. K.

From Kinetics and Catalysis, 55(5), 599-610; 2014

97. Single Step

Overview

Steps/Stages

Notes

1.1 R:

C:485324-38-7 oxygen-deficient, 80 h, 90°C

>98% conversion, alumina supported nickel oxide-based catalyst used, solid-supported catalyst, Reactants: 1, Reagents: 1, Catalysts: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Effect of the B-Site Composition on the Oxygen Permeability and the CO2 Stability of Pr0.6Sr0.4CoxFe1-xO3-δ (0.0 ≤ x ≤ 1.0) Membranes

By Partovi, Kaveh et al

From Chemistry of Materials, 27(8), 2911-2919; 2015

Reaction Protocol

Procedure 1. Select in an attempt to assess the applicability of our PSCF membranes for the POM reaction, the membrane with a Co content ofx= 0.2 because of its relatively good performance in the previously discussed oxygen permeation operations with pure CO_2 as the sweep gas.
2. Increase the conversion rate of methane from 90% to >98%.

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98. Single Step

Overview

Steps/Stages

1.1 R:F_3CCO_2H

R:

R:CO, C:$CuCl_2$, C:Pd, S:H_2O, 20 h, 80-85°C

Notes

Reactants: 1, Reagents: 3, Catalysts: 2, Solvents: 1, Steps: 1, Stages: 1, Most stages in any one step: 1

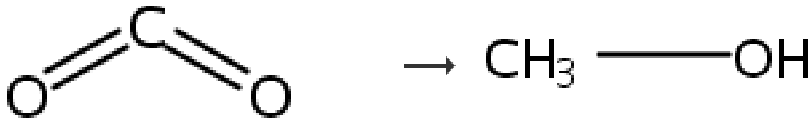
References

Copper(II) chloride

By Cosford, Nicholas D. P. et al

From e-EROS Encyclopedia of Reagents for Organic Synthesis, , 1-8; 2015

99. Single Step



Overview

Steps/Stages

1.1 R:HCl, R:H_2

R:

C:Cu, C:ZnO, C:Pd, C:Al_2O_3, rt

Notes

Reactants: 1, Reagents: 3, Catalysts: 4, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Method for preparing methanol with tail gas generated in preparation process of veterinary medicine pre-mixing agent

By Zheng, Xiaogang et al

From Faming Zhuanli Shenqing, 105175226, 23 Dec 2015

100. Single Step

Overview

Steps/Stages

1.1 R:

C:Ni, C:CeO_2, C:64417-98-7, C:7699-43-6, 800°C

Notes

fixed bed tubular reactor used, Ni-doped (CeO2)-YSZ used as catalyst, catalyst prepared and used, aerobic, selectivity = 100%, Reactants: 1, Reagents: 1, Catalysts: 4, Steps: 1, Stages: 1, Most stages in any one step: 1

References

Ni-doped (CeO2-δ)-YSZ mesoarchitectured with nanocrystalline framework: The effect of thermal treatment on structure, surface chemistry and catalytic properties in the partial oxidation of methane (CPOM)

By Somacescu, Simona et al

From Journal of Nanoparticle Research, 17(11), 1-16; 2015

Experimental Procedure

Catalytic studies In our study, the conversion profile recorded on NCYZTR800 for the catalytic partial oxidation of methane (see Fig. 8a) showed that this material is active above 400 °C with methane completely converted at 800 °C, with a selectivity of almost 100 % in CO. Blank tests performed in the presence of quartz wool and using the same reaction parameters as during the catalyst screening showed no detectable occurrence of homogeneous reactions. Figure 8a presents the effect of temperature on the catalytic activity. The methane conversion values were taken after 30 min of reaction at each temperature. Products of methane oxidative coupling (C_2 and higher hydrocarbons) have not been observed on the entire temperature range. Oxygen is totally consumed starting with 500 °C; therefore, the conversion is not given in the results section. At the initial reaction temperature of 400 °C, conversion of CH_4 was only 10 %, and the main reaction products were CO_2 and H_2O. As the temperature was increased stepwise to 700 °C, the CH_4 conversion increased to 73 %, but total oxidation to CO_2 and H_2O remained the dominant reaction. A further increase in reaction temperature to 750 °C, however, resulted in a sudden change in selectivity. The selectivity of CO increases with temperature, in detriment of CO_2 formation (Fig. 8) as thermodynamically expected (Miao et al. 1997).

Reaction Protocol

Procedure

1. Record the conversion profile on NCYZTR800 for the catalytic partial oxidation of methane showed that this material is active above 400 °C with methane completely converted at 800 °C, with a selectivity of almost 100 % in CO.
2. Perform blank tests in the presence of quartz wool.

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