

Contents of *Catalysis Today*, Volume 25

Vol. 25, No. 1

IN SITU IR SPECTROSCOPY OF INTERMEDIATES IN HETEROGENEOUS OXIDATIVE CATALYSIS

V.A. Matyshak and O.V. Krylov (Moscow, Russia)

1. Introduction	1
2. Molecular spectroscopic study of the properties of intermediates in heterogeneous catalytic reaction	2
2.1 Transmission spectroscopy	2
2.2 Diffuse reflectance IR spectroscopy	3
2.3 Emission spectroscopy	6
2.4. Conclusions	8
3. Partial olefin oxidation	9
3.1. Partial oxidation of ethene	9
3.2. Partial oxidation of propene to acrolein (general information)	11
3.3 Propene oxidation over a Bi–Mo–Mg–O system	13
3.4. Partial butene oxidation to acrolein over complex oxides	18
3.5. Conclusions	22
4. Interaction of nitric and carbon oxides over metal surfaces	22
4.1. Introduction	22
4.2. Reaction of carbon monoxide and nitric oxide in the presence of oxygen on a supported rhodium catalyst	30
4.3. Interaction of CO and NO in the presence of oxygen on supported Pt	39
4.4. Interaction of CO and NO on supported Pd and Ru	43
4.5. The influence of oxygen on the CO + NO interaction over supported platinum-group metals	43
4.6. Regularities of the CO + NO interaction on supported metals	47
5. CO and NO interaction on oxide systems	48
5.1. CO and NO reaction on simple oxides	48
5.2. Spectrokinetic study of CO + NO interaction on spinel systems	52
5.3. NO + CO interaction over supported copper oxide	55
5.4. Some regularities of the surface steps proceeding in the CO–NO reaction on metals and oxides	60
6. NO _x reduction over copper-containing zeolites	61
6.1. NO reduction by hydrocarbons	61
6.2. NO reduction by CO	65
7. Ammonia oxidation	68
7.1. Ammonia oxidation over metals	68
7.2. Ammonia oxidation over oxides: introduction	71
7.3. Ammonia oxidation on MoO ₃	72
7.4. Ammonia oxidation on ZnO and Fe ₂ O ₃	75
7.5. Ammonia oxidation on Cr ₂ O ₃	79
8. General conclusions	81
References	82

Vol. 25, No. 2**PERIODIC OPERATION OF CATALYTIC REACTORS**

Guest Editors: P.L. Silveston, R.R. Hudgins (Waterloo, Ontario, Canada) and A. Renken (Lausanne, Switzerland)

Preface	89
Periodic operation of catalytic reactors —introduction and overview P. Silveston, R.R. Hudgins (Waterloo, Ontario, Canada) and A. Renken (Lausanne, Switzerland)	91
Periodic operation of a catalyst as a means of overcoming a thermodynamic constraint. The case of methane homologation on metals H. Amariglio, P. Paréja and A. Amariglio (Vandœuvre les Nancy, France)	113
Fischer–Tropsch synthesis under periodic operation A.A. Adesina (Sydney, NSW, Australia), R.R. Hudgins and P.L. Silveston (Waterloo, Ontario, Canada)	127
Catalytic oxidation of carbon monoxide under periodic and transient operation E. Gulari, X. Zhou and C. Sze (Ann Arbor, MI, USA)	145
The simulated countercurrent moving bed chromatographic reactor: a catalytic and separative reactor M.C. Bjorklund and R.W. Carr (Minneapolis, MN, USA)	159
Increasing of carbon monoxide methanation rate by forced feed composition cycling K. Klusáček and V. Stuchlý (Prague, Czech Republic)	169
Automotive exhaust catalysis under periodic operation P.L. Silveston (Waterloo, Ontario, Canada)	175

Vol. 25, Nos. 3–4**CATALYSIS IN MEMBRANE REACTORS**

Guest Editors: J.A. Dalmon, A. Giroir-Fendler, C. Mirodatos and H. Mozzanega (Lyon — Villeurbanne, France)

Foreword	197
Membrane catalysis: where is it now, what needs to be done? J.N. Armor (Allentown, PA, USA)	199
Silicalite-1 zeolite composite membranes R.D. Noble and J.L. Falconer (Boulder, CO, USA)	209
Permeation and separation behaviour of a silicalite-1 membrane F. Kapteijn, W.J.W. Bakker, J. Van de Graaf, G. Zheng, J. Poppe and J.A. Moulijn (Delft, The Netherlands)	213
Sol–gel derived silica membranes with tailored microporous structures A. Ayril, C. Balzer, T. Dabadie, C. Guizard and A. Julbe (Montpellier, France)	219
Catalytic membrane reactor for oxidative coupling of methane. Part 1: preparation and characterisation of LaOCl membranes P. Chanaud, A. Julbe, A. Larbot, C. Guizard, L. Cot (Montpellier, France), H. Borges, A. Giroir Fendler and C. Mirodatos (Villeurbanne, France)	225
Novel preparation of Pd/Vycor composite membranes K.L. Yeung, J.M. Sebastian and A. Varma (Notre Dame, IN, USA)	231
Preparation and characterization of novel porous metal/ceramic catalytic membrane materials . ZhaoHongbin (Stuttgart, Germany), . XiongGuoxing, . GuJinghua, . ShengShishan (Dalian, People's Republic of China), H. Bauser, N. Stroh (Stuttgart, Germany) and K. Pflanz (Dalian, People's Republic of China)	237
Amorphous Pd–Si alloys for hydrogen-permeable and catalytically active membranes N. Itoh, T. Machida, W.-C. Xu (Tsukuba, Japan), H. Kimura and T. Masumoto (Sendai, Japan)	241
Porous Pt/SiO ₂ catalytic membranes prepared using mesitylene solvated Pt atoms as a source of Pt particles G. Vitulli, E. Pitzalis, P. Salvadori (Pisa, Italy), G. Capannelli, O. Monticelli, A. Servida (Genova, Italy) and A. Julbe (Montpellier, France)	249
Immobilization of polymers on cellulose acetate membranes T.V. Knyaz'kova (Kiev, Ukraine)	255

Characterization of porous ceramic membranes for their use in catalytic reactors for methane oxidative coupling J. Herguido, D. Lafarga, M. Menéndez, J. Santamaría (Zaragoza, Spain) and C. Guimon (Pau, France)	263
Gas phase electrocatalysis on metal/Nafion membranes O. Enea, D. Duprez (Poitiers, France) and R. Amadelli (Ferrara, Italy)	271
Catalysis with homogeneous membranes loaded with nanoscale metallic clusters and their preparation D. Fritsch and K.-V. Peinemann (Geesthacht, Germany)	277
Overview on industrial membranes R. Soria (Bazet, France)	285
Catalysis with membranes or catalytic membranes? J.R.H. Ross and E. Xue (Limerick, Ireland)	291
Steam reforming of methane in a membrane reactor S. Lægsgaard Jørgensen, P.E. Højlund Nielsen and P. Lehrmann (Lyngby, Denmark)	303
Control of transport properties with a microporous membrane reactor to enhance yields in dehydrogenation reactions D. Casanave, A. Giroir-Fendler, J. Sanchez (Villeurbanne, France), R. Loutaty (Harfleur, France) and J.-A. Dalmon (Villeurbanne, France)	309
Application of membrane reactor for dehydrogenation of ethylbenzene W.-S. Yang, J.-C. Wu and L.-W. Lin (Dalian, People's Republic of China)	315
Membrane integrated system in the fusion reactor fuel cycle A. Basile (Arcavacata di Rende CS, Italy), V. Violante (Rome, Italy), F. Santella and E. Drioli (Arcavacata di Rende CS, Italy)	321
Asymmetric Pd–Ag/stainless steel catalytic membranes for methane steam reforming J. Shu, B.P.A. Grandjean and S. Kaliaguine (Quebec, Canada)	327
Palladium/ceramic membranes for selective hydrogen permeation and their application to membrane reactor E. Kikuchi (Tokyo, Japan)	333
Dehydration of 1-butanol over γ -Al ₂ O ₃ catalytic membrane M. Lu, G. Xiong, H. Zhao, W. Cui, J. Gu (Dalian, P.R. China) and H. Bauser (Stuttgart, Germany)	339
An experimental study on the application of polymer membranes to the catalytic decomposition of MTBE (methyl <i>tert</i> -butyl ether) J.K. Lee, I.K. Song and W.Y. Lee (Seoul, South Korea)	345
Limiting conversions of dehydrogenation in palladium membrane reactors N. Itoh (Tsukuba, Japan)	351
Pressure drop membrane reactor equilibrium analysis H.W. Deckman, E.W. Corcoran, J.A. McHenry (Annandale, NJ, USA), J.H. Meldon (Medford, MA, USA) and V.A. Papavassiliou (Annandale, NJ, USA)	357
Equilibrium-shift in alkane dehydrogenation using a high-temperature catalytic membrane reactor E. Gobina, K. Hou and R. Hughes (Salford, UK)	365
Propene oxidation over MoO ₃ film deposited on an Au YSZ Ag system T. Tsunoda, T. Hayakawa, Y. Imai, T. Kameyama, K. Takehira and K. Fukuda (Tsukuba, Ibaraki, Japan)	371
Catalytic membrane reactor for oxidative coupling of methane. Part II — Catalytic properties of LaOCl membranes H. Borges, A. Giroir-Fendler, C. Mirodatos (Villeurbanne, France), P. Chanaud and A. Julbe (Montpellier, France)	377
Gas–solid oxidations with RuO ₂ –TiO ₂ and RuO ₂ –SiO ₂ membranes V. Părvulescu, V.I. Părvulescu, G. Popescu (Bucharest, Romania), A. Julbe, C. Guizard and L. Cot (Montpellier, France)	385
Competition between molecular and anionic diffusion of oxygen in a catalytic membrane reactor for oxidation reaction S. Azgui, F. Guillaume, B. Taouk and E. Bordes (Compiègne, France)	391
Activation of methane using solid oxide membranes J.E. Ten Elshof, B.A. Van Hassel and H.J.M. Bouwmeester (Enschede, Netherlands)	397
Oxidative dehydrogenation of propane on catalytic membrane reactors A. Pantazidis, J.A. Dalmon and C. Mirodatos (Villeurbanne, France)	403
Nitrobenzene liquid-phase hydrogenation in a membrane reactor J. Peureux, M. Torres, H. Mozzanega, A. Giroir-Fendler and J.-A. Dalmon (Villeurbanne, France)	409
An ion-exchange membrane reactor for esterification of oleic acid and methanol: REMI B. Chemseddine and R. Audinos (Toulouse, France)	417

Membrane assisted liquid phase catalytic oxidation of sulfides O.M. Ilinitich and Yu.S. Vetchinova (Novosibirsk, Russia)	423
Poison resistant catalysis with microporous catalyst membranes W.F. Maier and H.-C. Ko (Mülheim a.d. Ruhr, Germany)	429
Activity of immobilized lipxygenase used for the formation of perhydroxyacids F. Petrus Cuperus, G.F.H. Kramer, J.T.P. Derksen and S.Th. Bouwer (AA, Wageningen, Netherlands)	441
Porous membrane catalysts with Pd–M-clusters for liquid phase hydrogenation of dehydrolinalool A.N. Karavanov, V.M. Gryaznov, V.I. Lebedeva, I.A. Litvinov, A.Yu. Vasil'kov and A.Yu. Olenin (Moscow, Russia)	447
Author index to volume 25	451
Contents to volume 25	455
Previous issues of Catalysis Today	A1