

References

- 1 P. Gray and S. K. Scott, "Chemical Oscillations and Instabilities", Clarendon Press, Oxford, 1990
- 2 V. A. Vasilev, Yu. M. Romanovskii, D. S. Chernavskii and V. G. Yakhno, "Autowave Processes in Kinetic Systems", VEB Deutscher Verlag der Wissenschaften, Berlin, 1987
- 3 I. Langmuir, *Trans. Faraday Soc.*, 1921, 17, 607
- 4 R. Imbihl, in: "Optimal Structures in Heterogeneous Reaction Systems", ed. P. Plath, Springer Series in Synergetics, 1989, p.26
- 5 M. Mundschau, M. E. Kordesch, B. Rausenberger, W. Engel, A. M. Bradshaw and E. Zeitler, *Surf. Sci.*, 1990, 227, 246
- 6 O. H. Griffith and G. F. Rempfer, in "Advances in Optical and Electron Microscopy", Vol. 10, eds. R. Barer and V. E. Coslett, Academic Press, London, 1987 p.269
- 7 E. Bauer, M. Mundschau, W. Swiech and W. Telieps, *Ultramicroscopy*, 1989, 31, 49
- 8 H. H. Rotermund, W. Engel, M. E. Kordesch and G. Ertl, *Nature (London)*, 1990, 343, 355
- 9 S. Jakubith, H. H. Rotermund, W. Engel, A. von Oertzen and G. Ertl, *Phys. Rev. Lett.*, 1990, 65, 3013
- 10 G. Ertl, *Catal. Lett.*, 1991, 9, 219
- 11 H. H. Rotermund, S. Jakubith, A. von Oertzen, S. Kubala and G. Ertl., *J. Chem. Phys.*, 1989, 91, 4942
- 12 E. Savitsky, V. Polyakova, N. Gorina and N. Roshan, "Physical Metallurgy of Platinum Metals", Mir Publishers, Moscow, 1978, p.106
- 13 M. Flytzani-Stephanopoulos and L. D. Schmidt, *Prog. Surf. Sci.*, 1979, 9, 83
- 14 A. H. Cottrell, "Dislocations and Plastic Flow in Crystals", Clarendon Press, Oxford, 1953, p.3
- 15 M. E. Kordesch, W. Engel, G. John Lapeyre, E. Zeitler and A. M. Bradshaw, *Appl. Phys. A.*, 1989, 49, 399
- 16 M. J. Cardillo, *Langmuir*, 1985, 1, 4
- 17 J. A. Serri, M. J. Cardillo and G. E. Becker, *J. Chem. Phys.*, 1982, 77, 2175
- 18 M. Shelef, *Catal. Rev. Sci. Eng.* 1975, 11, 1
- 19 T. Fink, J. -P. Dath, M. R. Bassett, R. Imbihl and G. Ertl, *Surf. Sci.*, 1991, 245, 96
- 20 H. H. Madden and R. Imbihl, *Appl. Surf. Sci.*, 1991, 48/49, 130

Platinum Catalyses the Conversion of Methane to Higher Alkanes

A research group at the Université de Nancy and Laboratoire Maurice Letort, France, has found that the standard platinum catalyst EUROPT-1 promotes the conversion of methane to a range of saturated hydrocarbons up to C₆ or C₇.

A recent report (M. Belgued, P. Pareja, A. Amariglio, and H. Amariglio, *Nature*, 1991, 352, (6338), 789-790) indicates that the reactions take place at moderate temperatures. The catalyst was reduced in a flow of hydrogen at 400°C, followed by a helium flush and cooling to the temperature of the experiment (150 to 280°C). The sample was then fed with a flow of pure methane. Transient evolutions of hydrogen and ethane were immediately observed. At 250°C and after an exposure to methane of 1 minute, the rate of ethane evolution passed through a maximum. Fast production of saturated hydrocarbons ranging from C₁ to C₆ or C₇ resulted from subsequently flushing the catalyst with hydrogen at the same temperature.

It was concluded from the results of a temperature-programmed desorption experiment carried out under the same conditions that the fraction of methane converted was 19.3 per cent. The authors have experimental evidence to support their hypothesis that the

higher hydrocarbons are obtained via oligomerisation of CH_x species. They indicate two potential advantages of their method over the oxidative coupling for the conversion of methane into higher hydrocarbons: these being the much lower reaction temperatures and the fact that unconverted methane can be recycled. Low conversion efficiency is at present a limitation of this new process, however, and the possible inhibiting effects of deposited carbon on catalyst efficiency are currently being assessed. The technological progress implied by these results indicates that the use of a platinum catalyst, together with the choice of reaction temperatures and use of a flow reactor may have been significant factors. D.T.T.

Metal-Hydrogen Systems

A previous issue of this journal carried a selective report of the International Symposium on Metal-Hydrogen Systems, Fundamentals and Applications, held in Banff, Canada, September 2nd-7th, 1990, (R.-A. McN., *Platinum Metals Rev.*, 1991, 35, (1), 24-27). The papers presented at that meeting, including those in the special sessions on hydrogen pairing in metals, have now been published in the *Journal of the Less-Common Metals*, 1991, 172-174, Parts A and B.