diesel qualities were introduced between 1991 and 1993. Reasons for the change, the costs and environmental benefits ensuing, and the tax differentials which succeeded in encouraging use were described. Other critical factors are refinery investment costs, fuel tax revenues, crude supply and operating costs.

J. Lucas (Tesco Stores Ltd) discussed cleaner fuels. Tesco offers both City Diesel and City Petrol from the majority of their filling stations. City Petrol is a low benzene content unleaded petrol which meets the proposed European Specifications for year 2005. While the fuels are readily available, there are problems in supply and with customer awareness. Price parity is therefore needed to ensure the widespread use of these cleaner fuels. Tesco also run 100 of their goods delivery vehicles with CRT™ units.

Conclusions

This first conference on health effects caused by vehicle emissions indicated the depth of interest in air quality. Although high pollution levels increase hospital admissions, questions remain on pollution dosages and effects. With further demands on transport and lowering of permitted emissions, automotive manufacturers and suppliers will continue to reduce emissions from engines by cleaner combustion and by optimised catalyst systems.

JAMES P. WARREN

Self-Organisation of Nanostructures

A recurrent theme in contemporary research has been the understanding of processes of self-assembly or self-organisation. Perhaps the fascination that this topic exerts is its ubiquitous nature, from the co-ordinated movements of very large flocks of birds to the organisation of living organisms.

The chemist's (and physicist's) viewpoint has been to investigate the types of interaction that underpin co-operative phenomena, in attempts to highlight the common denominator responsible for structure recognition. Examples of this abound in the literature, as for instance, the seminal work of Langmuir at the beginning of the century on the ordering of molecules at interfaces resulting from a balance of polar/non-polar intermolecular interactions. In this case, the driving force for molecular recognition and self-organisation can be identified with particular aspects of molecular structure and functionality.

The forces responsible for organisation can be more subtle than those mentioned above, which rely on specific functionalities. One example of this is the ordering and crystallisation processes observed for non-interacting systems composed of particles of different sizes (1). In this case, entropic effects are entirely responsible for phase structure and composition. Importantly, there are now examples that these effects occur not only for systems having dimensions in the micrometre range, but also in the nanoscale dimension (2).

There is at present an intense interest in identifying the forces responsible for self-organisation of nanostructures formed at crystal surfaces. These issues have recently been further explored in a paper by Pohl and colleagues (3). The main question that they address is the nature of the forces responsible for order in a single monolayer of silver on a ruthenium (0001) surface, in particular in relation to the behaviour of vacancy islands formed by exposure to sulfur. The mobility of isolated vacancy islands has been measured by scanning tunnelling microscopy (STM), as previously observed for cobalt layers on copper (111) (4). The analysis of thermal fluctuations of the vacancies and their displacement is a beautiful example of the application of STM to the analysis of nanoscale structures. From the statistical analysis of these displacements, the forces responsible for the stabilisation of the island vacancy lattice can be investigated. These forces result from line tensions, related to the reduction of co-ordination by creating an island, and film strain due to elastic deformation resulting from strain in the film around the edges of islands. The possibility of predicting the structures formed from surface stresses can open up new avenues for designing self-organised surfaces.

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