Renewable Energy from the Sun And Recent Progress of Organic Photovoltaics

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SUMMARY

Solar energy can provide a clean, reliable, renewable source of electric power. However, the present increasing cost of silicon requires that we find a more efficient means of utilising available silicon resources. The concept of using luminescent solar concentrators (LSCs) to reduce the cost of photovoltaic power dates back to the late 1970s (Weber and Lambe, 1976). Energy transfer systems based on the organization of dye molecules in nanoporous hosts (zeolites and arrays of silica nanochannels, ASNCs, Figure 1) have the potential to solve the self-absorption problem and at the same time increase the photostability of the devices (Barnham et al., 2000).

Fig. 1. One-dimensional nanochannels in microporous and mesoporous aluminosilicates

Much of this work has been concerned with the synthesis of dye-zeolite systems featuring light absorption over a wide range of wavelengths coupled with efficient energy transfer to a comparatively small number of red-emitting dyes. Materials currently under investigation contain three types of dyes (two types of donor dyes, one type of acceptor dye).

Keywords: energy, luminescent solar concentrator, fluorescent dye, renewable.

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