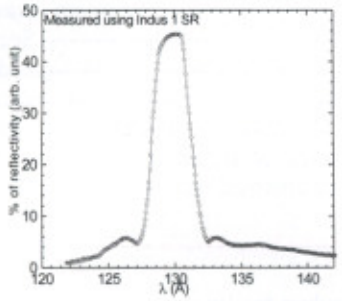

Fig. A.9.2 Wavelength dependence of Mo/Si ML at 46° incidence angle

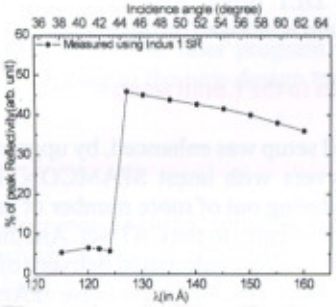

Fig. A.9.3 Wavelength dependence of peak reflectivity of Mo/Si ML (N=30)

(Contributed by: M. Nayak; nayak@cat.ernet.in,
G.S. Lodha and R.V. Nandedkar)

A.10 Diffuse reflectance analysis of dyes with FTIR spectrometer

Fourier transform infrared (FTIR) spectrometer installed in our lab has provision to accommodate diffuse reflectance assembly. Solid organic compounds with dipole moment absorb IR radiations depending upon number of bonds, atomic arrangements and functional groups. Diffuse reflectance (DR) analysis is a simple and convenient substitute of other solid sample analysis techniques. It is used for structural studies and presence of impurities of the IR active molecules. Organic dyes dissolved in solvents such as water or alcohols, due to their high polarity, make it difficult to study individual components (fig.A.10.1 & A.10.3). Most of the components merge together and produce spectrum, which does not disclose either complete structure or presence of impurities in the molecule. With DR we studied pH sensitive, anodizing and Rhodamine 6G dyes. These spectra clearly show individual components present in the dyes (fig. A.10.2 and A.10.4). Anodizing dyes are being used in the chemical treatment facility and Rhodamine 6 G in the dye lasers. Both these dyes were dissolved in solid and dehydrated

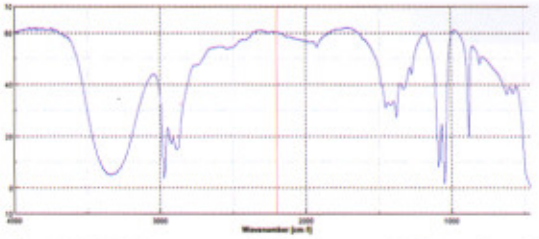

Fig. A.10.1 Spectrum of Rhodamine 6 G in ethanol

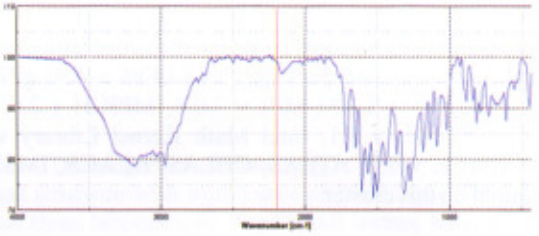

Fig. A.10.2 DR Spectra of Rhodamine 6

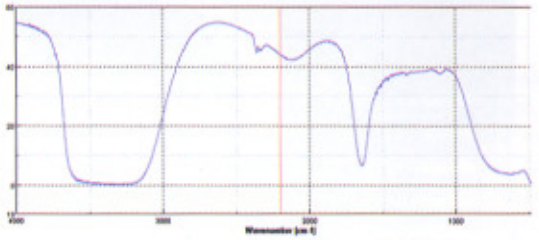

Fig. A.10.3 Spectrum of anodizing dye in water

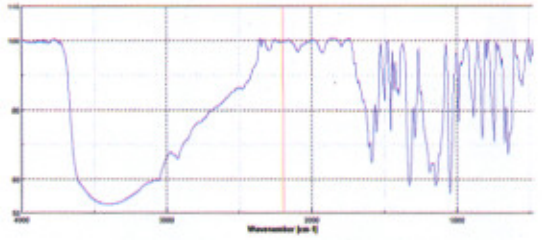

Fig. A.10.4 DR Spectra of anodizing dye

spectroscopic grade potassium bromide matrix and scanned between 400 to 4000 cm^{-1} wave numbers (mid IR region). The spectra shows presence of – NH, Benzene ring modes, C – O – C, CO, CH_2, CH_3 and C = C, etc. absorption bands.

The spectra shows presence of bonded (carboxylic acid) and free – OH, Benzene ring modes, CH_3 symmetric and asymmetric stretches and C = C, etc. absorption bands. Peak area at a particular wave number shows concentration of individual component in the molecule. On this basis quantification of dyes is also possible.

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