

Design and development of a micro-Raman Multichannel spectrograph for thin film and spectroscopy applications

A Czerny-Turner type of multichannel spectrograph (Fig. 9) using CCD as a detector was designed and developed indigenously. The spectrograph uses a plane grating of frequency 1200 grooves/mm, concave spherical mirror of focal length 0.523 m as a collimating element and concave spherical mirror of focal length 0.5 m as a focusing element. The linear dispersion of the spectrograph varies from 2.519 pixel / Å to 2.686 pixel / Å. The spectrum is recorded on the CCD array of pixels 1024 X 256. The pixel size is 26 micron x 26 micron. A Raman imaging microscope was utilized to irradiate the micro particles of the sample by a diode pumped solid state green laser of wavelength 532 nm. The same instrument is also used to collect the Raman scattered light on to the entrance slit of the multichannel spectrograph. The accuracy of wavelength measurement is found to be about 1 Å. The instrument works in the wavelength region from 4000 Å to 7000 Å.

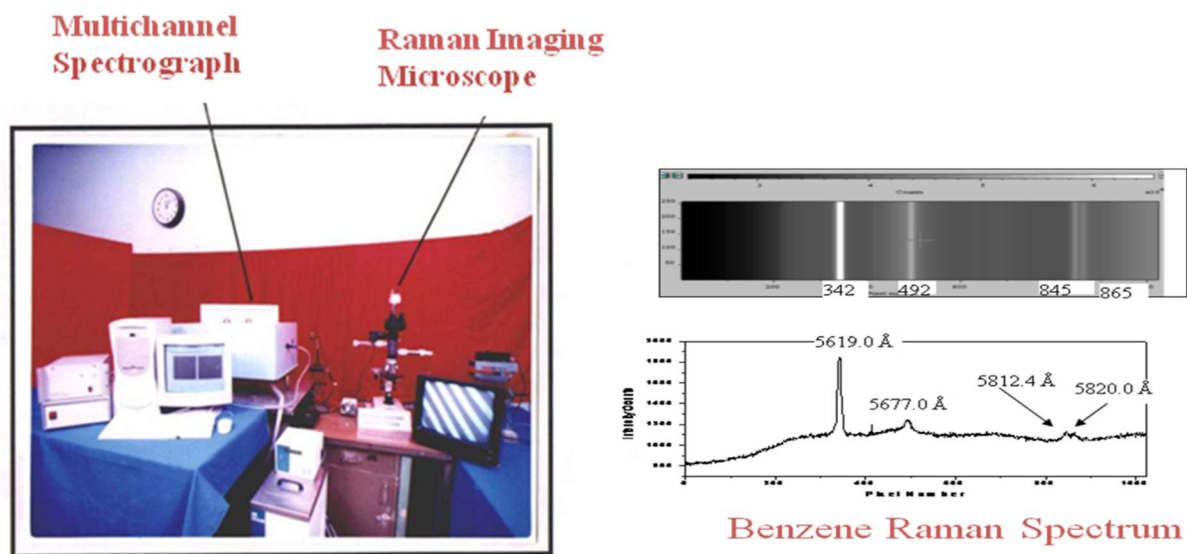


Fig. 9: (a) Photograph of a micro-Raman spectrograph along with (b) a typical spectrum of benzene as recorded using the instrument