

Spontaneous and stimulated Raman scattering of lasing dyes in polymer matrices and molecule microcrystals (powders)

Saturday, 26 September 2020 13:05 (1 minute)

Raman spectroscopy is an important and informative source of information about dye molecules structure and its interaction with the matrix. However, very intensive luminescence of lasing strongly interferes detection of weak Raman scattering radiation. The use of conventional techniques of Raman spectra observation is restricted and complicated due to intense dye luminescence and wide absorption band. Thus development and investigation of alternative methods for Raman spectroscopy by using stimulated Raman possibilities is an actual problem.

This work is devoted to developing a new stimulated Raman spectra spectroscopy technique based on random lasing observation under strong light scattering (SRS-RL method) within the dye embedded in the vesicular polymer film. The observed structure was compared with dye Raman spectra in crystalline and polymer solutions forms obtained by conventional technique.

It was shown that Raman spectra observed by conventional technique reveal preferably the intense spectral lines of the polymeric matrix and substrate. Nevertheless, the SRS-RL method being inapplicable to dye powder investigating partially correlates with the dye powder conventional spectrum. Thus the comparison and analysis of both techniques spectra demonstrate that in contrast to conventional technique the SRS-RL method is applicable for Raman spectroscopy of organic dye solid solution.

Topics

Session B. Laser physics and modern optoelectronics

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Session Classification: Poster session