



Dipole-Quadrupole Theory of Surface Enhanced Infrared Absorption and Appearance of Forbidden Lines in the SEIRA Spectra of Symmetrical Molecules

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(Submitted on 7 Apr 2012)

The paper presents main aspects of the Dipole-Quadrupole theory of Surface Enhanced Infrared Absorption (SEIRA). It is pointed out the possibility of appearance of the lines, caused by totally symmetric vibrations transforming after the unit irreducible representation, which are forbidden in usual infrared absorption spectra in molecules with sufficiently high symmetry. Observation of such lines in the SEIRA spectra of diprotonated and ethylene, adsorbed on and on mordenites is pointed out. The results well agree with our ideas about surface enhanced optical processes, based on the conception of a strong quadrupole light-molecule interaction, which allows us to develop the SERS and SEIRS theories.

Comments: 15 pages, 3 figures, 1 table

Subjects: **Optics (physics.optics)**; Chemical Physics (physics.chem-ph)

Cite as: **arXiv:1204.1652v1 [physics.optics]**

Submission history

From: Aleksey Polubotko [[view email](#)]

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