

Excitonic shoulders in the reflectance and absorption spectra of 1-D semiconductors with a metal-halide chain

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The reflectance and absorption spectra of 1-D compounds with a chain $---M(II)---X—M(IV)—X$ (where $M = Pt$ or Pd and $X = Cl, Br$) have been studied. The spectra show a strong band in the visible or the near-infrared region and a shoulder in the low frequency side of the band. The shoulder is attributed to Wannier excitons, and its position and intensity depends on the size, the shape and the aggregation of crystallites and on the temperature. This assignment is in accordance with the excitation resonance Raman profiles the position of which follows the position of the shoulders. Analogous results have been obtained from simple semiconductors such as CdS , but in the case of one-dimensional semiconductors the size, the shape and the aggregation effects are stronger. This result is expected, since the excitonic radius is small compared to the size and the separation of the particles.

This work was one in collaboration with R. Rapsomanikis, S. Mourikis and C. S. Jacobsen. A fuller comprehensive article will be published elsewhere.

