Modeling the Optical Constants of Diamonds from 0.06 to 30 eV

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Abstract

The optical properties of diamonds are modeled over a wide spectral range with the modified Adachi's model. Model parameters were estimated by use of the acceptance-probability-controlled simulated annealing algorithm. The employed model is quite flexible, as it uses an adjustable broadening function at each critical point. The broadening function can vary over a range of functions with similar kernels but different wings, so that extended absorption tails inherent to the conventional Lorentzian broadening can be eliminated. Good agreement with the experimental data is obtained in the entire investigated range. The obtained relative rms error for the real part of the index of refraction equals 4.7%, whereas for the imaginary part of the index-of-refraction relative rms error is 3.6%.

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