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Dielectric Properties of Mixed and Complex Compounds

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ABSTRACT

The average energy gap (E_g) and optical refractive index (n) of mixed and complex crystals are computed from the measured values of (E_g) and (n) of pure crystals. The pure crystals have fixed values of optical and dielectric parameters, which do not in general, match exactly with the values required in opto-electronic compounds for specific use. Thus it is proposed to develop the mixtures of binary compounds which may have their properties matching exactly with the values required in opto-electronic compound. An empirical relation between n and E_g is developed for mixed compound families by using these computed values. This relation shows a fine agreement with ion-dependent dielectric model of compounds. This study is limited to binary solids of I-VII, II-VI and III-V type cross compounds. This prescribed theory can therefore be used for different mixed crystal as well as for complex compounds. The theoretical validity of the relation is also established. This theory is applicable for explaining the intermolecular behaviour of solids of other families of similar nature which can be extended for polar and non-polar liquids too. Certain industrial and technical applications are also proposed.

Keywords: Average energy gap, Optical refractive index, Dielectric model, Opto-electronic compounds, Binary solids, Cross compounds, Polar and Non-Polar liquids.
