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Relationship between superconductivity and calculated σ–band conductivity in MgB_2 PABLO DE LA MORA, GUSTAVO TAVIZON, Facultad de Quimica, UNAM, Mexico, D.F. — Four different relaxation times were needed to adjust the electrical conductivity and Hall coefficient to experimental values in MgB_2. Al-doping was analyzed in the *rigid band approximation*; this permitted a detailed study of the partial substitution of magnesium for aluminium ($Mg_{1x}Al_xB_2$). Other substitutions such as AB_2 (A=Be, Sc, Zr, Nb and Ta) were also discussed. In ($Mg_{1x}Al_xB_2$) T_c diminishes with Al content, the other compounds are not superconductors or have a low T_c. In this work it was found that with electron doping, such as Al substitution, the σband conductivity decreases in a very similar way as T_c and the corresponding bands become less anisotropic. σband contribution for BeB_2 and ScB_2 at E_F is very small and the anisotropy is much lower. For Zr, Nb and Ta there are no σbands at E_F. These results give a clear connection between superconductivity and the character of the σ-band, band conductivity, and band anisotropy. This gives a plausible explanation for the diminution of T_c with different doping of MgB_2

Pablo de la Mora
Facultad de Ciencias, UNAM, Mexico, D.F.

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