

Abstracts

Conductivity and the Microwave Properties of 81-Permalloy Thin Films (Correspondence)

R.H. Havemann and L.E. Davis. "Conductivity and the Microwave Properties of 81-Permalloy Thin Films (Correspondence)." 1971 Transactions on Microwave Theory and Techniques 19.1 (Jan. 1971 [T-MTT]): 113-116.

The microwave properties of 81-Permalloy (81 percent nickel-19 percent iron) films less than 1050 Å thick and without an external magnetic field have been studied at 10 GHz. The measured dc conductivity values $\sigma_{sub m}$ were approximately one-half the values ($\sigma_{sub m}$) predicted by the Fuchs-Sondheimer (F-S) theory for monovalent metals, and an indirect check was obtained by comparing measured reflection and transmission coefficients (R and T) with values calculated using $\sigma_{sub m}$ and $\sigma_{sub s}$. The power transmission coefficient was obtained from the insertion loss, and calculated values of insertion loss using $\sigma_{sub m}$ agreed within 2 percent with directly measured values. Calculated values of R using $\sigma_{sub m}$ showed good agreement with directly measured values for film thicknesses less than 300 Å, but with thicknesses between 300 Å and 1050 Å the directly measured values of R were up to 5 percent smaller than those predicted using $\sigma_{sub m}$. Using the F-S conductivity, calculated values of T were approximately an order of magnitude lower than directly measured values, and calculated values of R were as much as 13 percent higher than directly measured values.

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