

Abstract Submitted
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Optical Properties of Bulk Nickel as a Function of Temperature¹

LAURA PINEDA, STEFAN ZOLLNER, New Mexico State University — Nickel is a silvery-white metal, element number 28 in the first row of the transition metals. It is ferromagnetic below the Curie temperature ($T_C=630$ K), i.e., it retains a net magnetization in the absence of a magnetic field. When heated above the Curie temperature, it becomes paramagnetic and loses its magnetization. The literature reports a distinct change in the slope of the DC electrical resistivity of nickel versus temperature near the Curie transition. Similarly, a change in the optical reflectivity of nickel has been reported at T_C . We therefore used spectroscopic ellipsometry to measure the complex refractive index of nickel with very high precision from 77 to 800 K. In our data for $n(T)$, we find deviations from linearity near 150 K and near 590 K. The refractive index also changes again at even higher temperatures. We believe that our data are affected by two factors: (1) The native oxide on the Ni surface disintegrates above 700 K, leading to a change in the surface condition of our sample. (2) The optical constants also change near the Curie temperature. Work is in progress to separate the two observed phenomena.

¹Alliance for Minority Participation

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