Superconducting parameters of aluminum-lithium alloys

M.N. OU, Academia Sinica and National Chiao Tung Univ., Taiwan, B.J. CHEN, Y.Y. CHEN, Academia Sinica, Taiwan, J.C. HO, Wichita State Univ. — Superconducting transition temperatures $T_c$ near 1 K of single-phase fcc aluminum-lithium alloys, with 0 to 10 at.% Li, have been determined through ac susceptibility data. Earlier calorimetric measurements above 2 K on the same samples yielded the Debye temperature $\theta_D$ and the density of states at Fermi level $N(0)$ from the lattice specific heat coefficient and the electronic specific heat coefficient, respectively. Following the modified BCS expression, $T_c = 0.85\theta_D\exp[-1/N(0)V]$, such experimentally derived $T_c$, $\theta_D$ and $N(0)$ values for each sample provide a measure of the electron-phonon interaction parameter $V$, which plays central roles in inducing the traditional superconductivity. Its value increases monotonically from 0.611 to 0.710 eV for 0 to 10 at.% Li.