ELECTRON SPIN RESONANCE IN FINE PARTICLES OF METALLIC LITHIUM

T. Fujita, K. Saiki, Y. Shimizu

To cite this version:

HAL Id: jpa-00217054
https://hal.archives-ouvertes.fr/jpa-00217054
Submitted on 1 Jan 1977

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
ELECTRON SPIN RESONANCE IN FINE PARTICLES OF METALLIC LITHIUM

T. FUJITA, K. SAIKI (*) and Y. SHIMIZU (**)  
Department of Physics, Nagoya University, Nagoya, 464, Japan

Abstract. — The relaxation of conduction electron spins in fine particles of metallic lithium was measured by an X-band spectrometer at room temperature. Those particles of diameter from about 3 000 to 100 Å were prepared by evaporation method in an inert gas atmosphere. The line of the electron spin resonance broadened from 2.7 to 9.2 Oe as the average particle diameter was reduced from 3 000 to 1 000 Å. As the particle diameter was further reduced, the line narrowed again remarkably. The narrowest line width obtained was 1.9 Oe for particles of diameter 100 Å. The effect of line broadening is explained by the limitation of electron spin life time by the spin reverse scattering at the surface of the particles. The narrowing of line at smaller particle region is considered to the quenching of spin reverse scattering by the quantization of electronic energy levels in fine particles.

(*) Present address : Ishikawajima-Harima Heavy Industries Co., Ltd. Ootemachi Chiyoda-ku Tokyo, 100, Japan.  
(**) Present address : Kinjo Gakuin, Nagoya, Japan.