Magnetism of Pd7Ni3 nano alloy particles YUNG-YUAN HSU, S. R. SHEEN, M. K. WU, Institute of Physics, Academia Sinica, Taipei 115, Taiwan, K. W. WANG, T. P. PERNG, Department of Material Science Engineering, National Tsing Hua University, Hsinchu 300, Taiwan — The magnetic properties of Pd$_7$Ni$_3$ alloy nano-particles, $\sim$10 nm diameter, prepared from chemical precipitation followed by reduction reaction are reported. Magnetic palladium alloys is interesting for the enhanced magnetic moments due to Ni doping into Pd, ordinarily paramagnetic, with ferromagnetic transition temperature $T_C$, for bulk, of about 327 K. While prepared in the nano size, depending on preparation procedures and dispersity, samples exhibit super-paramagnetism, spin-glass-like or even Curie-Weiss-like behaviors. However, enhancement of the magnetic moment remains with an enhancement magnitude of about 0.3 $\mu_B$ smaller and is preparation method dependent. The complicated magnetic behavior observed may suggest a surface spin effect. Possible core-shell magnetic structure for particles of such small diameter along with the chemically observed core-shell nonuniformity by EXAFS further complicated the observed magnetic behavior.

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Date submitted: 29 Nov 2004