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ACCEPTED MANUSCRIPT

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Yb₂Pt₂Pb

Tuli Chatterjee¹

A comprehensive explanation of the observed thermal variation of the magnetic susceptibility

and the magnetic heat capacity data has been carried out in the framework of one electron

crystal field theory. The peaks at the Neel temperature T_N=2.07 K is due to magnetic order and

cannot be explained by the crystal field theory. A check of the Stark energies reported for the

system from the analysis of the data from inelastic neutron scattering experiment is looked

forward to.

Keywords: crystal field, magnetic susceptibility, magnetic anisotropy, heat capacity, crystal field

strength.

1. Introduction Ytterbium based intermetallic compounds with composition R_2T_2M (R= rare

earths; T = transition metals; M = Pb, In, and Sn) has attracted much attention because the

compounds in this series exhibit collective phenomena, such as ferromagnetic Kondo lattice,

Kondo semiconductor, valence fluctuation, non-Fermi liquid, and heavy fermion behaviour

etc.

From single crystal X-ray diffraction measurements it has been established that Yb₂Pt₂Pb

crystallizes in the tetragonal U₂Pt₂Sn-type structure (space group P4₂/mnm) with lattice

parameters of a =0.77651(6) and c =0.70207(7) nm [1, 2]. In Yb_2Pt_2Pb , the basal plane (ab

planes) are occupied only by R elements and the alternate ab planes are occupied by T and M

elements along c-axis. Thus the rare earth elements constitute a network of isosceles

triangles, suggesting that one might expect a quasi-two-dimensional magnetic structure and

anisotropic magnetic properties. This is a 4 f -localized magnetic system, and strong magnetic

frustration may arise from the geometry of the Shastry-Sutherland lattice [2, 3]. The magnetic

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