

## The crystal structure and magnetic properties of an organic verdazyl biradical.

K. Iwase<sup>a</sup>, H. Yamaguchi<sup>a</sup>, H. Nojiri<sup>b</sup>, A. Matsuo<sup>c</sup>, K. Kindo<sup>c</sup>, and Y. Hosokoshi<sup>a</sup>

<sup>a</sup>Department of Physical Science, Osaka Prefecture University, Japan

<sup>b</sup>Institute for Materials Research, Tohoku University, Japan

<sup>c</sup>The Institute for Solid State Physics, The University of Tokyo, Japan

A verdazyl radical is known as one of the stable organic radicals but few examples are reported crystal structures. We will report the crystal structure and the magnetic properties of metaphenylenebisverdazyl biradical (*m*-Ph-V<sub>2</sub>). This compound was first synthesized by R. Kuhn et al.<sup>1</sup> and preliminary magnetic susceptibility measurements were reported by N. Azuma et al.<sup>2</sup>. We succeeded in solving the crystal structure for the first time. We also examined the magnetic properties. The temperature dependence of the product of the magnetic susceptibility and temperature ( $\chi_p T$ ), which is proportional to the square of effective magnetic moment, shows a round maximum at about 40 K and a stationary behavior at half the value of the room temperature in the temperature range of 4 -7 K. In the crystal structure, the dimeric structure of molecules is noticeable and we succeeded in analyzing the susceptibility data by the four spin cluster model with  $S = 1/2$ . We have estimated the intramolecular ferromagnetic interactions  $J_1/k_B = -23$  K and intermolecular antiferromagnetic interactions with  $J_2/k_B = 31.5$  K by using the Hamiltonian,  $H = J_1(S_1 \cdot S_2 + S_3 \cdot S_4) + J_2(S_2 \cdot S_3)$ .

<sup>1</sup>R. Kuhn, F. A. Neugebauer and H. Trischmann, *Angew. Chem.*, **76**, 691 (1964)

<sup>2</sup>N. Azuma, K. Ishizu and K. Mukai, *J. Chem. Phys.*, **61**, 2294 (1974)