

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**A material design for double honeycomb lattice superconductors**

SHIN-ICHI SHAMOTO, Neutron Science Research Center, Japan Atomic Energy Research Institute, Tokai, 319-1195, Japan — According to our structural studies for double honeycomb lattice superconductors [1], their transition temperatures have been well scaled by their transfer integrals between the nearest neighbor transition metal atoms. Based on this finding, a material design for the bandwidth of a double honeycomb lattice superconductor is proposed. One of the high- $T_c$  candidates,  $A_x\text{YOCl}$  (A; alkali metal) with narrow bandwidth, was found to be an insulator. This means that the  $A_x\text{HfNCl}$  system ( $T_c^{max}=25.5$  K) is close to an insulator region. Nevertheless, there remains a high possibility to find high- $T_c$  materials in the double honeycomb lattice compounds based on our material design, since there are many compounds with the double honeycomb lattice modified from a popular  $\text{CdI}_2$ -type structure. [1] For example, S. Shamoto *et al.*, *Physica C* 402 (2004) 283-292.

Shin-ichi Shamoto  
Japan Atomic Energy Research Institute

Date submitted: 11 Jan 2005

Electronic form version 1.4