

Abstract Submitted  
for the TS4CF08 Meeting of  
The American Physical Society

**New Structures for Jewelry Applications in Palladium**<sup>1</sup> JACQUELINE CORBITT, ERIN GILMARTIN, GUS HART, Brigham Young University — An intriguing intermetallic structure with 8:1 stoichiometry was discovered in the 1950s in the Pt-Ti system. Since then a handful of other Pt/Pd/Ni binary systems have been observed to exhibit this curious structure ( $\text{Pt}_8\text{Zr}$ ,  $\text{Pd}_8\text{Mo}$ ,  $\text{Ni}_8\text{Nb}$ , etc). This ordered structure can significantly increase the hardness of the material. For jewelry applications involving Pt and Pd, international hallmarking standards require that the alloys be at least 95% pure by weight. However, these metals are often soft when purity is high if the minority atoms are disordered. Because the 8:1 structure maintains a high weight percentage of Pt/Pd, it can satisfy purity standards while increasing performance. Recent calculations suggest that the 8:1 structure may form in about 20 previously unsuspected Pt/Pd binary systems. For this study, we investigated the possibility of Pd-rich compounds in Pd-Nb and Pd-Cu.

<sup>1</sup>We gratefully acknowledge support from the National Science Foundation, Grant No. DMR-0650406.

Jacqueline Corbitt  
Brigham Young University

Date submitted: 16 Sep 2008

Electronic form version 1.4