

Abstract Submitted
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Thermodynamic modeling of Pt-Al and Pd-Al DEREK CARR,
Brigham Young University — Pure platinum and pure palladium are too soft for typical jewelry applications. Adding small amounts of other metals can significantly increase their performance. However, international hallmarking standards require the alloys to be 95% pure by weight. How does one achieve significant improvements in performance adding only small amounts (5 wt-%) of other metals? Significant improvements are possible even with small additions if precipitate hardening can be induced. Using a combination of first-principles, cluster expansion, and Monte Carlo modeling, we have identified new Pt-rich/Pd-rich phases in Pt-Al and Pd-Al that should be useful in precipitate hardening. Thermodynamical modeling indicates that the phases are experimentally feasible (not kinetically inhibited).

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