

Dispersion Control Through Crystal Ordering: The Case of $L1_1$ Ag-Pt

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Intermetallics are stable compounds composed of metal atoms organized in a long range order. They are favored structures for their mechanical, catalytic and other properties due to the high dispersion of one metal in another. However, the formation of intermetallic compounds is often elemental specific. For example, Cu forms alloys and intermetallic compounds with Au but it is immiscible with Ag based on the binary phase diagram. Like Cu, Pt is also immiscible with Ag. Previous studies showed the existence of an intermetallic $L1_1$ phase within a very narrow composition window. However, due to the limitations in traditional metallurgy process, phase pure Ag-Pt intermetallic has never been observed. Here, we demonstrated a bottom-up approach for the preparation of Ag-Pt compositional intermetallic phase.