the alloy samples in the initial quenched state were a failure as ordering caused total embrittlement of the material.

Conclusions

Using this data, it is possible to solve the problem of enhancing the strength properties of ordered alloys in the copper-palladium system. One possible variant was discussed at the beginning of this paper; it involves heating the initially quenched Pd-Cu-Ag alloy (containing 20–25 wt.% Ag) to 600°C and subsequent cooling. The two-phase fine-grain structure formed may have a combination of relatively high strength and plastic characteristics.

Another method for strengthening Pd-Cu-Ag alloys containing less than 10 wt.% Ag involves solving the same task considered earlier in (7). Strength properties can be largely improved if an appropriate reinforcing framework is chosen for the plastic matrix. This means the dislocation framework inherited from the preliminary plastic deformation and which is 'built into' the ordered matrix. Fine particles of the silver-based phase, formed on the framework dislocations, considerably improve the strength properties of the alloy.

Acknowledgement

This study has been supported by the RFBR (Grant No. 02-03-32150).

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Alexei Yu. Volkov is a Senior Researcher in the Laboratory of Mechanical Properties, Institute of Metal Physics, Ural Branch of RAS, Ekaterinburg. He was awarded his doctorate in 1994. He has worked for nearly 20 years with relationships between microstructure and mechanical properties of ordered alloys based on gold and palladium. His research interests include physical, chemical and mechanical properties of precious metal alloys and their application as functional materials.

Luminescent Osmium(II) Carbonyls

Osmium (Os) atoms are highly effective in promoting spin-orbit interactions due to their heavy molecular weight and could thus make efficient phosphorescent materials.

Researchers from Taiwan have now prepared a new series of octahedral Os(II) carbonyl complexes $[Os(CO)_3X(dbm)]$ (X = CF_3CO_2, Cl, Br, I, SCN; dbmH = dibenzoylmethane) by using both solid-state pyrolysis and ligand exchange reactions (Y.-L. Chen, C. Sinha, I-C. Chen, K.-L. Liu, Y. Chi, J.-K. Yu, P.-T. Chou and T.-H. Lu, *Chem. Commun.*, 2003, (24), 3046–3047). The skeletal arrangement consists of one β-diketonate chromophore (dmb)H to balance the +2 formal charge on the Os, one anionic ligand X and three orthogonal CO ligands located at the octahedral coordination site.

At room temperature, in CH_2Cl_2, the Os complexes exhibit prominent $^3\pi$–π^* phosphorescence, with unusually long lifetimes (29–64 μs) and high quantum yields (0.08–0.13). These complexes have excellent photophysical and electrochemical properties, and may be employed in a variety of photochemical applications, such as organic light emitting diodes or photovoltaic devices.