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Characterization of the electrical properties of the Platinum-Palladium-Hydrogen system

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Abstract content
 (Max 300 words)

The electronic properties of the palladium-platinum-hydrogen system were characterized using variable field Hall effect measurements at room temperature. The Pd-Pt-H system was prepared by hydrogenating Pd-Pt alloy in an atmosphere consisting of a mixture of argon and hydrogen containing hydrogen at 15% at 110kPa at room temperature. Pd-Pt alloys of varying compositions were exposed to this atmosphere for various lengths of time under the same temperature and pressure conditions. For a fixed hydrogen exposure time, the specific resistivity decays with increasing platinum content. For a fixed platinum content, the specific resistivity increases with increasing exposure time. The explanation to this behavior is twofold: competitive formation of the β -phase hydride which exhibits a high intrinsic resistance compared to that of the α -phase solid solution, and the filling up of the conduction band of palladium by the valence electrons from the Pt. Palladium and its alloys have shown excellent hydrogen absorbing capabilities as well as resistance to surface oxidation. Understanding the influence of hydrogenation of palladium and its alloys is important in the design of hydrogen sensors for use in the nuclear, electronics and food industries.

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