

Important Gorsky effect influences on diffusion coefficients in metal-hydrogen systems

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Abstract

Gorsky effect involvements in regard to the diffusion of hydrogen in metallic solids has meant that, in addition to operations of concentration gradients, expansion effects of interstitials themselves can promote a reverse direction diffusion flux component. In cases where concentrations of Hydrogen interstitials have already been present in diffusion membranes, such strain gradients can produce experimentally observable overall long range 'uphill' effects. Specific quantitative evidence of this behaviour has been recorded in the case of hydrogen diffusion in Palladium, Palladium/Platinum and Palladium/Silver, and has been shown to influence calculations of hydrogen diffusion coefficients. There now also seem strong possibilities that such strain gradient production can have important influences in phase transition and other solid state processes.

Indexed keywords

Engineering controlled terms: Diffusion in solids; Mathematical models; Palladium; Phase transitions; Platinum; Point defects; Silver; Strain

Engineering uncontrolled terms: Diffusion flux equation; Gorsky effect; Metal-hydrogen systems

Engineering main heading: Hydrogen fuels