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Thermodynamic stability of VO₂ in contact with thin metal films

Solid state compound phase formation has been investigated between thin metal films (Co, Hf, Ni, Pd and Pt) and VO₂ substrates using RBS and XRD. The thin-film couples were annealed from 45 min to 1 hr between 400 and 900 degrees centigrade. It was found that Hf reacts with VO₂ whereas Co, Ni, Pd and Pt do not. Heats of reaction were calculated for all possible combinations of the vanadium alloy and metal oxide reaction products. Comparison with experimental results show in all cases that reactions take place for negative heats of reaction. Results obtained correlate well with a Miedema parameter providing a way of predicting a reaction.

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