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Onset of magnetism in transition-metal monolayers: V and Rh on Ag(001)

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Abstract:

We discuss the onset of magnetic structures in very thin V and Rh overlayer slabs on an Ag(001) substrate in terms of the exchange integral J . We use a self-consistent real-space tight-binding method in the unrestricted Hartree-Fock approximation to the Hubbard Hamiltonian. In both cases, the results display onset of magnetism essentially in the monolayer range. For thicker coverage of Ag(001), the magnetism is quickly killed. This thickness dependence of the magnetism may explain discrepancies between the experimental results performed with various techniques in different groups, in the case of V on Ag(001). Our simple model for Rh on Ag(001) is not able to reproduce the experimental situation plagued by interdiffusion.

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