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## **Magnetism of Dilute Oxides**

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Reports of Curie temperatures well above room temperature for wide-bandgap oxides doped with a few percent of transition-metal cations have triggered intense interest in these materials as potential magnetic semiconductors. The origin of the magnetism is debated; in some systems, the ferromagnetism can be attributed to nanoparticles of a ferromagnetic secondary phase, but in others, properties are found which are incompatible with any secondary phase, and an intrinsic origin related to structural defects is implicated. The magnetic interactions in these materials are qualitatively different from those in magnetically-concentrated compounds, and the standard 'm/-J paradigm' of localised magnetism seems unable to explain their behaviour. In this chapter we review some of the data on a selection of the most widely-studied materials, and raise issues that still have to be addressed.