MAGNETISM IN MAN-MADE MATERIALS*

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Man-made low dimensional magnetic systems, including surface, interfaces and multilayers, have attracted a great amount of attention and excitement in the past decade because, as expected, the lowered symmetry and coordination number offer a variety of opportunities for inducing new and exotic phenomena and so hold out the promise of new device applications. Local spin density functional *ab initio* electronic structure calculations employing the full potential linearized augmented plane wave (FLAPW) method have played a key role in the development of this exciting field by not only providing a clearer understanding of the experimental observations but also predicting new systems with desired properties. Results reviewed here demonstrate the range and depth of problems treated by the modern theory of magnetism including : (i) strong magnetic enhancement of both spin and orbital moments, (ii) the observed surface (interface) magnetic anisotropy(which can be reproduced correctly in the theoretical calculations, although the anisotropy energy is only-10.4-10.5eV), (iii) the extension of theory to determine, for the first time, the even smaller magnetostriction energy in bulk and reduced dimensional materials, (iv) the magneto-optics and (v) magneto-transport (ie, GMR).

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