Springer Reference
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Handbook of Spintronics

- Broadens understanding of all aspects of spintronics science and Technology
- Covers fundamental physics, materials properties and processing, device technology and applications
- Brings international and leading researchers' work in academia and industry together
- Provides readers with an up-to-date and comprehensive review of the dynamic field of spintronics

This large reference work addresses a broad range of topics covering various aspects of spintronics science and technology, ranging from fundamental physics through materials properties and processing to established and emerging device technology and applications. It comprises a collection of chapters from a large international team of leading researchers across academia and industry, providing readers with an up-to-date and comprehensive review of this dynamic field of research. The opening chapters focus on the fundamental physical principles of spintronics in metals and semiconductors, including the theory of giant magnetoresistance and an introduction to spin quantum computing. Materials systems are then considered, with sections on metallic thin films and multilayers, magnetic tunnelling structures, hybrid materials including Heusler compounds, magnetic semiconductors, molecular spintronic materials, carbon nanotubes and graphene. A separate section describes the various methods used in the characterisation of spintronics materials, including spin-polarised photoemission, x-ray diffraction techniques and spin-polarised SEM. The third and final part of the Handbook contains chapters on spintronic device technology and applications, including spin valves, GMR and MTJ devices, MRAM technology, spin transistors and spin logic devices, spin torque devices, spin pumping and spin dynamics, and thermal effects in spintronics. Each chapter builds from the fundamentals through to the state-of-the-art, also considering the challenges faced by researchers and containing some indication of the direction that future work in the field is likely to take. This reference work will be an essential and long-standing resource for the spintronics community, whether in academic or industrial research.

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