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# Microstructures and Properties of Martensitic Materials

Guest Editor:

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## Message from the Guest Editor

Martensite was evidenced in steels at the end of the 19th century. It is a particular complex microstructure made of isolated or intricate laths or plates built by the collective displacements of atoms during a diffusionless phase transformation. It can be observed in many materials, such as cobalt, titanium, zirconium, shape memory alloys, in some gold alloys, brasses and other copper alloys, and in some ceramics and polymers. Their extraordinary mechanical and physical properties, used in many industrial domains, explain why these materials have been extensively studied for the last century. The phenomenological theory, developed in the 1950s, filled a gap in our understanding regarding their crystallography, morphologies and mechanical properties, but many questions remain unsolved or prone to controversies. The way that atoms move, the correlation with phonon softening, the effect of chemical composition, the link with other types of microstructures (for example, Widmanstätten ferrite, bainite, or massive phases), and the role of the dislocations/disclinations, all these issues are still open to discussions and debates.

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