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Aspects of Shape Memory Effect and Super elasticity in Shape Memory Alloys**Osman Adiguzel***Firat University, Turkey*

A series of alloy systems called shape memory alloys exhibit a peculiar property called shape memory effect, and take place in class of advanced smart materials, with this property. Shape memory effect, which is characterized by the recoverability of two certain shapes of material at different conditions. This phenomenon is initiated on cooling and deformation processes and performed thermally on heating and cooling, with which shape of materials cycles between original and deformed shapes in reversible way in bulk level. Therefore, this behavior can be called thermal memory or thermo elasticity. Thermo elasticity is governed by two crystallographic transformations, thermal and stress induced martensitic transformations. Thermal induced martensite occurs on cooling along with lattice twinning and ordered parent phase structures turn into twinned martensite structures by means of lattice invariant shears, and these structures turn into detwinned martensitic structures with deformation by means of stress induced transformation. Lattice twinning occurs in $\langle 110 \rangle$ -type directions on the $\{110\}$ -type plane of austenite matrix in self-accommodating manner. These alloys exhibit another property, called superelasticity, which is performed with stressing and releasing the material in elasticity limit at a constant temperature in the parent phase region, and shape recovery occurs instantly upon releasing. Super elasticity exhibits ordinary elastic material behavior, but it is performed in non-linear way; loading and unloading paths are different at the stress-strain diagram, and hysteresis loop refers to energy dissipation. This phenomenon is also governed by stress induced transformation and ordered parent phase structure turn into twinned martensite structure with stressing.

Biography

Dr Adiguzel graduated from Department of Physics, Ankara University, Turkey in 1974 and received PhD- degree from Dicle University, Diyarbakir-Turkey. He has studied at Surrey University, Guildford, UK, as a post-doctoral research scientist in 1986-1987, and studied on shape memory alloys. He worked as research assistant, 1975-80, at Dicle University and shifted to Firat University, Elazig, Turkey in 1980. He became professor in 1996, and he has been retired due to the age limit of 67; following academic life of 45 years.