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Contribution ID: **7** Type: **Student contribution**

Nanoscale Exsolution and Interface Structures in High-Temperature Shape Memory Alloys

Ti-Ta alloys possess an attractive high temperature shape memory properties with potential to be utilized for aerospace and MEMS applications. However, their applications are limited by the formation of complex omega phase during thermo-mechanical cycling, which hampers the martensitic transformation and shape memory effect.To overcome this problem, exsolution of omega phase through rapid heating has been suggested to be a solution. In this work, we investigate the formation and exsolution of omega phase using Transmission Electron Microscopy(TEM) supported with Synchrotron X-ray Powder Diffraction. Selected Area Diffraction(SAD) was performed to acquire structural information on matrix, martensites, and omega phase. Chemical analysis with ultimate spatial resolution was studied by using Atom Probe Tomography(APT).

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Session Classification: Student session

Track Classification: Student contribution