

SLIP AND DEFORMATION BEHAVIOR IN INTERMETALLIC COBALT-SAMARIUM PHASES

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The ferromagnetic compounds SmCo_5 and $\text{Sm}_2\text{Co}_{17}$ are widely cherished for their excellent magnetic properties, but not much is known about their plastic deformation behavior and the underlying defect mechanisms. Since intermetallic phases in the Co-Sm system share structural motifs, the assumption is, that parallels between their nanomechanical deformation behavior can be drawn and are therefore investigated for those. Nanoindentation, micropillar compression tests and transmission electron microscopy (TEM) imaging and diffraction were utilized to achieve a detailed insight into the active slip systems of the SmCo_5 single crystal samples in different crystallographic orientations. Furthermore, these experiments were correlated to atomistic simulations. Contrary to a previous investigation, no amorphous slip bands were observed, but plastic deformation with clear slip systems, most distinguished along the $(0\ 0\ 0\ 1)$ plane and the $(\bar{2}\ 1\ 1\ 2)$ plane with slip directions of $[\bar{1}\ 2\ \bar{1}\ 0]$ and $[2\ \bar{1}\ \bar{1}\ 3]$ respectively.