Combined X-ray and Neutron Diffraction study of Mo₅Re₂Si sigma phase

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In an exploration as to the possible effects of the addition of Silicon into the known Mo-Re system, a Mo-Re-Si alloy was created (78, 18.5 and 3.5 wt% respectively) from which a single-phase composition was identified and characterized by x-ray and neutron powder diffraction. Mo₅Re₂Si was found to form as a tetragonal phase consisting of 30 atoms arranged at five unique sites exhibiting close tetrahedral packing in space group number 136 (P4₂/mnm) common to intermetallic sigma phases.