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# M1Po2B-04: Oxidized structure and Compositional properties of 1144 phase FBS by analytical electron microscopy

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The 1144 phase (Ae1A1Fe4As4) shows a strong advantage of engineering fabrication among Fe (Iron)-based superconductor (FBS) family due to the robustness of its superconducting properties with respect to chemical inhomogeneities, granted by its uniform crystalline-layered structure. This regularity is furthermore associated to crystalline defects capable of acting as efficient pinning centers, which high critical currents achieved at high fields for these superconductors. Like other FBS phases, its lossless current-carrying capability can be remarkably degraded by distractions at grain boundaries (GBs). GB oxidation is an issue of upmost importance to the realization of the practical FBS application for high field (> 20T) magnet. In this study, we explore oxidized grain boundary and intrinsic grain structural properties of 1144 polycrystalline samples by applying analytical electron microscopy such as atomic resolution scanning transmission electron microscopy and atom probe tomography. These structural properties of samples produced by a mechanochemically assisted synthesis are evaluated following the degradation of superconducting properties due to oxidation. We observe a strong correlation between the contamination at grain boundaries and the decrease of transport properties of the bulk sample, while the crystallin structure seems to be not affected by the oxidation.

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