Evolution of Crystal Structure and Magnetism in Single-Crystal (Ba,Sr,Ca)Fe$_2$As$_2$ Solid Solutions

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— Superconductivity in the FeAs-based materials has motivated extensive studies of structural, magnetic and electronic properties of these systems. A common element of the 122 FeAs-based intermetallic series is the occurrence of a simultaneous structural and antiferromagnetic phase transition, which occurs at temperatures ranging between 130 K and 200 K in the Ba, Sr, and Ca-based parent compounds. We present a systematic study of the evolution of the magnetic and structural properties of solid solutions of these parent compounds obtained through electrical transport, magnetic susceptibility, x-ray and neutron scattering measurements of single-crystal samples, discussing the relation between magnetic order and structural aspects through the solid solution series.