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Evolution of magnetic structure in the square lattice iridate $Sr_2Ir_{1-x}Rh_xO_4$[1] FENG YE, SONGXUE CHI, MASAAKI MATSUDA, XIAOPING WANG, CHRISTINA HOFFMANN, BRYAN CHAKOUMAKOS, JAIME FERNANDEZ-BACA, Oak Ridge National Lab, TONGFEI QI, GANG CAO, University of Kentucky — $5d$ based iridates have continuously provides a fertile playground for the studies of novel physics driven by spin-orbit interaction (SOI) that rigorously competes with other relevant energies, particularly the on-site Coulomb interaction U. Using single crystal neutron diffraction and polarized neutron scattering analysis, we have investigated the evolution of spin and crystal structures in the doped $Sr_2Ir_{1-x}Rh_xO_4(0\leq x\leq 0.20)$. The parent Sr_2IrO_4 shows canted antiferromagnetic structure with spin lies in the basal plane. The spin orientation closely follows the rotation of the IrO_6 octahedra with total ordered moment of 0.21 μ_B/Ir. A small amount of Rh ions doped at the Ir sites drastically reduces the magnetic transition and modifies the spin configuration. The neutron scattering results provide experimental insights into the magnetic and crystal structure crucial to the understanding this prototype iridates.

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