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Structure-magnetism correlation induced by Mn substitution in bilayered perovskite $Sr_3(Ru_{1-x}Mn_x)_2O_7$ [1] QIANG ZHANG, Louisiana State Univ - Baton Rouge, FENG YE, SONGXUE CHI, Oak Ridge National Laboratory, DALGIS MESA, Louisiana State Univ - Baton Rouge, WEI TIAN, Oak Ridge National Laboratory, RONGYING JIN, WARD PLUMMER, JIANDI ZHANG, Louisiana State Univ - Baton Rouge — Elastic neutron scattering technique was employed to investigate the effect of Mn substitution on the structure, magnetism and their correlation in $Sr_3(Ru_{1-x}Mn_x)_2O_7$ (x=6%, 12% and 16%) crystals. While parent compound $Sr_3Ru_2O_7$ is paramagnetic, a small amount of Mn substitution induces an E-type antiferromagnetic order. With the increase of Mn substitution from 6 % to 16%, the ordered moment at Ru/Mn site increases significantly with an enhanced T_N from 20 K for x=6 % to 80 K for x= 16%, and the in-plane magnetic correlation lengths increase to achieve the maximum for x= 16% as indicated by the resolution-limited linewidth of the Hscans through $\mathbf{Q_{AFM}}$ =(0.5, 0, 0). Accompanied by the enhancement of T_N, the (Ru/Mn)O_6 octahedron rotation is found to be suppressed simultaneously, suggesting a correlation between (Ru/Mn)O_6 octahedron rotation and magnetism due to Mn substitution. Our findings indicate that Mn substitution on Ru in $Sr_3Ru_2O_7$ has a significant effect on the microscopic structure and magnetism as well as the correlations between them.

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