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Neutron scattering study of spin fluctuations on hole-overdoped KFe_2As_2 C.H. LEE, K. KIHOU, A. IYO, H. EISAKI, AIST, Jpn, H. K.-FURUKAWA, Ocha. Univ., H. USUI, K. KUROKI, The Univ. of Electro-Commun., T. SAITO, H. FUKAZAWA, Y. KOHORI, Chiba Univ., K. YAMADA, WPI, Tohoku Univ. — Spin fluctuations in Fe-based superconductors have attracted great attention since they can be a key factor of the formation of superconducting states. The inelastic neutron scattering technique is a powerful method to examine spin fluctuations, whereas measurements using a single crystal were restricted to Fe(Te,Se) or electron-doped AFe_2As_2 (A=Ba, Ca, or Sr) due to difficulty of growing a large single crystal. To overcome this problem, we have improved growth procedure and succeeded to grow single crystals of heavily hole-overdoped superconducting KFe_2As_2 ($T_c = 3.4$ K). It was believed that no spin fluctuation can be observed in KFe_2As_2, since the nesting of the Fermi surface disappears. To confirm the hypothesis, we have studied spin fluctuations of KFe_2As_2 by neutron scattering using single crystals at JRR-3 reactor of JAERI in Tokai. As results, a well-defined low-energy incommensurate spin fluctuation has been observed at $(\pi(1 \pm 2\delta),0)$ with $\delta = 0.16$. The direction of the peak splitting is perpendicular to that observed in Fe(Te,Se) or in $Ba(Fe,Co)_2As_2$ at high energies. The results suggest that spin fluctuation is more robust in hole-doped than in electron-doped Fe-based superconductors, or a new type of spin fluctuation emerges by heavily hole doping.

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