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Magnetic Phase Diagram of a Lacunar Spinel GaV_4Se_8 YURI FUJIMA, NOBUYUKI ABE, YUSUKE TOKUNAGA, TAKA-HISA ARIMA, Univ of Tokyo — The magnetic field (H) - temperature (T) phase diagram of a lacunar spinel GaV_4Se_8 is determined by means of AC magnetic susceptibility and magnetoelectric measurements on single crystals and classical Monte Carlo simulation. GaV_4Se_8 is pyroelectric below the structural phase transition temperature $T_S = 41$ K and magnetically ordered below $T_C = 17.5$ K. AC magnetic susceptibility measurement has revealed that GaV_4Se_8 undergoes successive magnetic phase transitions with increasing applied magnetic field. Each phase is assigned to cycloidal, skyrmion lattice and forced ferromagnetic phases. Both cycloidal and skyrmion-lattice magnetic orders induce electric polarization up to around $10 \mu\text{C}/\text{m}^2$ compared with ferromagnetic order, suggesting a spin-driven magnetoelectric nature in GaV_4Se_8 . The skyrmion lattice phase seems to be stable down to $T = 2$ K and up to $\mu_0 H = 370$ mT. This enhanced stability of skyrmion lattice in GaV_4Se_8 compared with GaV_4S_8 may provide a key to understand the formation mechanism of the skyrmion lattice.

Yuri Fujima
Univ of Tokyo

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