Pressure Dependence of Electrical Properties in the Layered Trianular Antiferromagnet $FeGa_2S_4$.

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AGa$_2$S$_4$ (A=Ni and Fe) shows a strongly two-dimensional layered triangular antiferromagnet with spin S=1 and S=2, respectively.[1] So, the materials show no feature indicating a long-range order for the geometrical frustration of antiferromagnetic interaction. Instead, a freezing phenomenon below T_f=16 K is observed in case of $FeGa_2S_4$. Especially, transport techniques are useful for studying $FeGa_2S_4$ since it has smaller resistivity value than that of $NiGa_2S_4$. It is also reported that the energy gap estimated by resistivities of $FeGa_2S_4$ is linearly reduced by pressure ($P \leq$8 GPa) and predicted to become zero around 15 GPa.[2] Then, we applied the further pressure in $FeGa_2S_4$ in order to find novel phenomena of metallic state arose by disappearance of energy gap. As a result of the transport measurements of $FeGa_2S_4$ under pressure up to 30 GPa using diamond anvil cell, we could not observed metallic state but observed a large energy gap drop around 10 GPa. This may indicate development of 3D antiferromagnetic interaction under pressure. In our lecture, we will also present magnetization results and these crystal structures given by X-ray measurement under pressure to investigate interactions between layers.

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[2]T. Tomita *et al.*, J. Phys. Soc. Jpn . **78**, 094603 (2009).