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## Elastic properties of $\text{SmRu}_4\text{P}_{12}$ at low temperatures

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We have performed ultrasonic measurements on both poly and single crystalline samples of filled skutterudite compounds  $\text{SmRu}_4\text{P}_{12}$  in the temperatures down to 500 mK and under the magnetic fields up to 14 T. A remarkable anomaly was observed in the temperature dependence of elastic constants and ultrasonic attenuation at metal-insulator transition temperature of 16 K. Furthermore, a significant elastic softening was observed in  $(C_{11} - C_{12})/2$  and  $C_{44}$  below around 2 K. In this temperature region the system exhibits an insulating property. Thus we conjecture that this characteristic softening probably reflects on  $\Gamma_{67}$  quartet ground state. In fact, the level scheme of 4f electronic state of  $\text{Sm}^{+3}$ :  $\Gamma_{67}$  quartet(0 K) -  $\Gamma_5$  doublet(60 K) can reproduce successfully the present results. This indicates that orbital degree of freedom of 4f-ground state of  $\text{Sm}^{+3}$  still remain at low temperatures. We then suggest that the appealing hypothesis of antiferro-quadrupolar transition at 16 K is needed to be reconsidered.

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