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Ultrasonic study of filled skutterudite $TbRu_4P_{12}$ under pressure

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We investigated elastic properties of the filled skutterudite compound with heavy lanthanide $TbRu_4P_{12}$ by means of ultrasonic measurements under pressure for the first time. $TbRu_4P_{12}$ undergoes a two-successive phase transition from a paramagnetic to an antiferro-magnetically ordered phase at $T_N \sim 20$ K, then to another phase transition at $T_1 \sim 10$ K.[1, 2] We found that a clear elastic anomaly was observed at the two successive phase transition.[3] It is found that they both show a significant pressure dependence. A steep decrease closely associated with T_N is suppressed significantly, but it hardly shifts by applying the pressure. On the other hand, a slight anomaly associated with T_1 is gradually suppressed and shifts to lower temperatures by applying the pressure. We argue the elastic behavior and the possible interpretation in each ordering phase.

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