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Development of new techniques for high-pressure single-crystal synthesis of the filled skutterudite compounds

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A class of compounds with the filled skutterudite structure, RT_4X_{12} (R = rare earth, T = Fe, Ru and Os, X = P, As and Sb), has recently attracted much attention because of its variety of physical properties. As for a part of filled skutterudites, high quality single crystals have been grown by the flux method and could help us understand the essence of those anomalous physical properties so far. On the other hand, there still exist a large number of unsynthesized compounds, mainly RT_4As_{12} system. For such compounds, high-pressure synthesis is thought to be a powerful technique. Figure 1 shows a photograph of a high-pressure device installed in our laboratory. Using this device, we set to work on growing single crystals of the filled skutterudites at high pressures.



Figure 1: Photograph of a 700 ton cubic-anvil apparatus in our laboratory.