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Synthesis, Crystal Structure, and Magnetism of the New $\text{UIr}_4\text{Al}_{15}$ Compound PAUL TOBASH, FILIP RONNING, JOE THOMPSON, ERIC BAUER, Los Alamos National Laboratory — We report on single-crystals of a new compound grown from Al flux, $\text{UIr}_4\text{Al}_{15}$, crystallizing in the $\text{NdRh}_4\text{Al}_{15.4}$ type structure in the tetragonal space group $P4_2/nmc$ (No. 137) with unit cell parameters $a = 9.0239(6)$ Å and $c = 15.513(2)$ Å. The crystal structure of the compound was established from single-crystal X-ray diffraction and was found to be void of any crystallographic disorder. The U atoms center a polyhedron with the coordination number of each U atom being 20. The physical properties of $\text{UIr}_4\text{Al}_{15}$ were measured which included magnetic susceptibility, specific heat, and electrical resistivity. The compound was found to undergo long-range antiferromagnetic order at $T_N = 20$ K with a Sommerfeld coefficient extrapolated in the antiferromagnetically ordered state of *ca.* 42 mJ/mol-K². The physical properties suggest that $\text{UIr}_4\text{Al}_{15}$ may be an itinerant antiferromagnet. The compound belongs to a series of isostructural compounds, and preliminary results indicate that Th, La, Ce, Pr, Sm, Yb, and Lu analogues can be synthesized under identical conditions.

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