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Commensurate and incommensurate charge order in Fe_2OBO_3
MANUEL ANGST, Oak Ridge National Laboratory, Oak Ridge TN 37831, RAPHAEL HERMANN, FZ Juelich, 52425 Juelich, Germany, JONG-WOO KIM, Ames Laboratory, Ames IA 50011, PETER KHALIFAH, U Massachusetts, Amherst MA 01003, BRIAN C. SALES, DAVID G. MANDRUS, Oak Ridge National Laboratory, Oak Ridge TN 37831 — Charge order CO in the form of a Wigner crystal had been proposed by Attfield *et al.* [Nature **396**, 655 (1998)] based on measurements, particularly Mössbauer spectroscopy, on polycrystalline Fe_2OBO_3, but no superstructure due to the CO had been detected. We have grown the first single crystals of pure Fe_2OBO_3, and resistivity and thermal analysis indicate not one, but two transitions associated with CO. To elucidate the nature of these two transitions a synchrotron study was performed. At low T a superstructure corresponding to a doubling of the a axis was observed for the first time. The phase between the two phase transitions, in contrast, exhibits an incommensurate modulation with propagation vector $(\frac{1}{2},0,\tau)$, τ increasing with T towards $\frac{1}{2}$. Resonances in the energy-dependence of the scattered intensity around the Fe K edge suggest that the modulations in both phases are indeed associated with CO.

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