Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

X-ray and neutron diffraction study of $Co_{2-x}TiSn$ (x <0.5) solid solution[1] ANDREY KOSINSKIY, OYSTEIN PRYTZ, OLE-BJORN KARLSEN, Department of Physics, University of Oslo, P.O. Box 1048, Blindern, NO-0316 Oslo, Norway, MAGNUS SORBY, Institute for Energy Technology, Physics Department, P.O. Box 40, NO-2027 Kjeller, Norway — Heusler compounds are a large class of intermetallic materials with a wide range of applicable properties, spintronics and thermoelectrics just to mention a few. This class of materials can be divided into two main groups, materials with 2:1:1 composition called Heuslers and materials with 1:1:1 composition, also called Half-Heuslers. In some ternary systems with existence of Heusler structures there is a solid solution between Heusler and Half-heusler phases. In this work the Co-Ti-Sn ternary system was studied. Batches with different starting compositions ranging from CoTiSn to Co_2TiSn were arc melted. The buttons resulting from the arc melting were crushed, annealed and studied by in-lab X-ray, synchrotron and neutron diffraction, and by scanning (SEM) and transmission (TEM) electron microscopy. Phase equilibria is discussed with focus on structural composition and disorder in solid solution $Co_{2-x}TiSn$. In the literature there has been some discussion as to whether the Half-Heusler CoTiSn exists or not. Our observation supports the paper by T. Nobata et al. (2002) where $Co_{2-x}TiSn$ is reported for x ranging between 0.08 and 0.50.

[1]Financial support from the Norwegian Research Council through the thermometric project THELMA (228854) is gratefully acknowledged.

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Date submitted: 10 Jan 2014 Electronic form version 1.4