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Influence of grain size on precipitation hardening in melt-spun Sm(Co, Fe, Cu, Zr)$_z$ alloys[1] OZLEM KOYLU ALKAN, WEIQIANG LIU, Department of Physics and Astronomy, University of Delaware, Newark, Delaware 19716, USA, XIAOCAO HU, Department of Materials Science and Engineering, University of Delaware, Newark, Delaware 19716, USA, GEORGE C. HADJIPANAYIS, Department of Physics and Astronomy, University of Delaware, Newark, Delaware 19716, USA — In this work, we have investigated the influence of grain size on precipitation hardening that takes place in 2:17 Sm-Co magnets. An alloy with a nominal composition of $Sm(Co_{0.72}Fe_{0.12}Cu_{0.13}Zr_{0.03})_{7.6}$ was prepared by arc-melting and subsequently melt-spinning. The grain size was controlled by varying the wheel speed from 5 m/s to 50 m/s. The melt-spun ribbons were subsequently isothermally aged at 850 °C for 3 h followed by slow cooling at 0.7 K/min to 400 °C. A single 1:7 phase was detected in the as-spun ribbons and the grain size of ribbons estimated by Scherrer's formula was found to decrease gradually with the increasing of the wheel speed from 5 m/s to 50 m/s. After aging, the 1:7 phase was decomposed into $Sm_2(Co,Fe)_{17}$ and $Sm(Co,Cu)_5$ phase. For the 5 m/s ribbon, the coercivity increased drastically form 0.8 kOe to 11.2 kOe. On the other hand, the coercivity of the 35 m/s ribbon showed a little increase from 4.7 kOe to 6.3 kOe. TEM studies are currently under way to study the microstructure as a function of grain size and the results will be reported.

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