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Direct production of hard magnetic ribbons with enhanced magnetic properties by controlling cooling rate of melt

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Abstract

We produced a high-quality hard magnetic Fe81Co2Nb1Nd10B6 alloy by melt spinning without additional treatment. The as-spun ribbons produced at a wheel speed of similar to 25 m/s had the best hard magnetic properties: a remanence B-r, coercive force H-c, and maximum energy product (BH) (max) of 0.97 T, 676 kA/m, and 140 kJ/m(3), respectively. The Nd2Fe14B/alpha-Fe nanocomposite phases had grain sizes of similar to 10-30 nm. We investigated how the magnetic properties changed with wheel speed, finding that they depended on the as-spun structure and magnetic structure, which changed upon over-and under-quenching from the melt. (C) 2015 AIP Publishing LLC.

Keywords

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