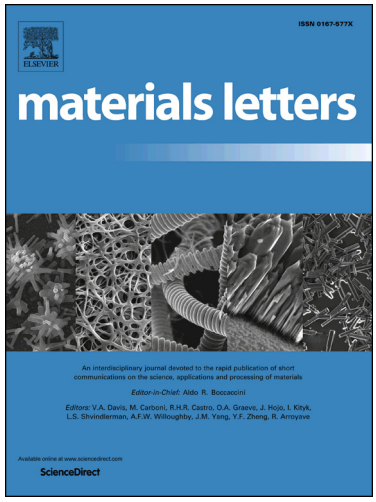

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Deformation-induced phase transformation of $Co_{20}Cr_{26}Fe_{20}Mn_{20}Ni_{14}$ high-entropy alloy during high-pressure torsion at 77 K

Jongun Moon[a], Yuanshen Qi[b], Elena Tabachnikova[c], Yuri Estrin[b,d], Won-Mi Choi[a], Soo-Hyun Joo[e], Byeong-Joo Lee[a], Aleksey Podolskiy[c], Mikhail Tikhonovsky[f], Hyoung Seop Kim[a,*]

[a]*Department of Materials Science and Engineering, POSTECH, Pohang 790-784, Korea*

[b]*Department of Materials Science and Engineering, Monash University, Clayton VIC 3800, Australia*

[c]*B. Verkin Institute for Low Temperature Physics and Engineering of Nationa 16 Academy of Sciences of Ukraine, Kharkov, 61103, Ukraine*

[d]*Laboratory of Hybrid Nanostructured Materials, National University of Science and 18 Technology "MISiS", 119049 Moscow, Russia*

[e]*Institute of Materials Research, Tohoku University, Sendai 980-8577, Japan*

[f]*National Science Center «Kharkov Institute of Physics and Technology» of National Academy of Sciences of Ukraine, Kharkov, 61108, Ukraine*

*Corresponding author: Tel.: +82 54 279 2150; E-mail: hskim@postech.ac.kr

Abstract

A deformation-induced phase transformation in a face-centered cubic (FCC) $Co_{20}Cr_{26}Fe_{20}Mn_{20}Ni_{14}$ high-entropy alloy during cryogenic high-pressure torsion (HPT) discovered in this work is reported. Thermodynamic calculations prove that in the $Co_{20}Cr_{26}Fe_{20}Mn_{20}Ni_{14}$ alloy, a hexagonal close-packed (HCP) phase is stable at low temperatures. Microstructural and compositional analyses suggest that a diffusionless deformation-induced FCC-to-HCP phase transformation occurred during cryogenic HPT.

Keywords: Metals and alloys; High-entropy alloy; High-pressure torsion; Microstructure; Phase transformation