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Synthesis of High or Low Melting Point Metallic Thin Films Utilizing Magnetized Coaxial Plasma Guns SAIGA YAEGASHI, KAORU SUZUKI, KEN-ICHI MATSUDA, SATOSHI KURUMI, TOMOHIKO ASAI, JUNICHI SEKIGUCHI, DAICHI KOBAYASHI, Nihon University — Recently, thermoelectric materials are of interest for applications as heat pumps and power generators. The Heusler-type intermetallic compound has received intense attention because of a large enhancement in the Seebeck coefficient by alloying high melting point transition metal (Ti, V, Fe) and low melting point paramagnetic metal (Al). In this study, we have attempted to develop a deposition system equipped with multi-source magnetized coaxial-plasma guns (MCPGs) for depositing materials having different melting points independently. The MCPGs is mainly consisted of a center rod-shaped target as a cathode electrode, an outer ring-shaped target as an anode electrode, and the pulsed-current generator. Argon gas was introduced into the chamber (1 Pa) as a working gas. DC voltages (1.5~3.5 kV) were charged to a capacitor (400 F) and then discharged (peak current: 10~70 kA) between Al and Fe targets utilizing a rectifier (Ignitron, National, NL-7703). They were accelerated by the Lorentz force due to high discharge current and ejected to a glass substrate. Al or Fe thin films were obtained on the substrate on which the plumes were deposited.

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