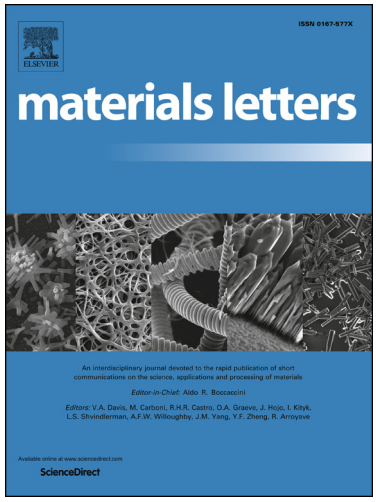

Effect of Mg addition on the physical properties of aluminum nitride

Sri Ayu Anggraini, Masato Uehara, Hiroshi Yamada, Morito Akiyama

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Effect of Mg addition on the physical properties of aluminum nitride

Sri Ayu Anggraini,[1)] Masato Uehara, Hiroshi Yamada and Morito Akiyama

Advanced Manufacturing Research Institute (AMRI), National Institute of Advanced Industrial Sciences and Technology (AIST), 807-1 Shuku machi, Tosu, Saga, 841-0052, Japan

ABSTRACT

We are reporting the effect of magnesium (Mg) addition into aluminum nitride (AlN) on piezoelectric and mechanical properties. Addition of 2.5 at.% Mg was found to slightly enhance both the piezoelectric constant (d_{33}) (up to 7.4 pC/N) and the relative permittivity (up to 12). Young's modulus and hardness were decreased when 2.5 at.% Mg was added into AlN and were slightly increased for sample with 5 at.% Mg addition. The dielectric loss was less than 10^{-2} for samples with Mg addition less than 8 at.%. However, higher Mg addition (> 8 at.%) led to a lower d_{33}, higher relativity permittivity while lowering Young's modulus and hardness.

Keyword: AlN; Piezoelectric material; Mg; Thin film; Sputtering

1. Corresponding author

Email: ayu-anggraini@aist.go.jp