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**RF-sputtered NbN superconducting thin film for the usage as an electrode of graphene FET and a flexible superconducting wire** JEONG-GYUN KIM, HAEYONG KANG, JOONG GYU KIM, YOUNG HEE LEE, DONGSEOK SUH, CINAP, IBS, DOES, Sungkyunkwan Univ. — Recent report on the usage of NbN as an electrode for two-dimensional electronic system such as graphene encourages the study of noble physical phenomena which makes the injection of superconducting charge carriers into the channel of graphene FET inducing the combination of superconductivity with quantum Hall effect. In this study, we examined NbN thin film deposited by rf-sputtering method in various conditions. We checked the effects of deposition temperature, working pressure, and relative flow-rate ratio between argon and nitrogen gases during sputtering. Structural analysis by XRD and SIMS showed that the NbN film was successfully deposited on the silicon-oxide substrate and the highest Tc obtained was 10.5K with high Hc2 over 14T at 5.5K for the film deposited at 600 oC. On the basis of optimal conditions, the change of superconducting properties depending on the deposition temperature was carefully examined for the development of low temperature deposition process that can be applied to the graphene FET fabrication. Additionally we tested the usage of flexible substrate for the deposition of this superconducting material on the purpose of highly flexible superconducting wire with greatly enhanced mechanical properties as reported recently for the MgB2 superconductor.

Jeong-gyun Kim
Sungkyunkwan Univ

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