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Dependence of Film Stresses on Different Anions in Binary CoNi Electrodeposits for Magnetic-MEMS Applications

자성 MEMS 용 이원계 CoNi 필름 스트레스의 Anions 타입에 대한 의존성

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Numerous studies of electrodeposited iron group thin films (Fe, Co and Ni) have been carried out because of potential applications in computer read/write heads [1-2], microelectromechanical systems (MEMS) [3-5], and ultra-large-scale integration (ULSI) devices [6-7]. Electrochemical processes (electrodeposition and electroless deposition) have many advantages over vacuum processes because of room temperature operation, various deposition parameters, easy scale up and maintenance, low production cost, relatively rapid deposition rate, the capability of handling complex geometries, and the ability to tailor deposit structure and properties.

The film stress plays an important role in the fabrication process of MEMS devices because, unlike in the data storage application, the thickness of magnetic films in MEMS can range from nanometers (e.g. NEMS devices) to few millimeters thick (e.g. high aspect ratio microstructures using LIGA and SU-8 processes). High stress in magnetic thin/thick films may result in malfunction of MEMS devices because of deformation or detachment of the deposited films from the substrate (e.g. Si substrate). Therefore, it is very important to develop high performance soft magnetic materials with minimum film stress.

In this work, the film stress changes of CoNi thin films electrodeposited from various baths with increasing cobalt contents were studied. The rest of detailed test results will be further discussed.

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