

**Influence of some additives on the process
of Ni-W alloy electroplating**

*Yiyong WU, **Dongsoo Kim, **Do-Yon Chang, **Sik-Chol Kwon

*School of Materials Science and Engineering, Harbin Institute of Technology,
Harbin 150001, China; Surface Engineering Department, Korea Institute of
Machinery and Materials, Changwon, Kyungnam, Korea 641-010

** Surface Engineering Department, Korea Institute of Machinery and Materials,
Changwon, Kyungnam, Korea 641-010

Ni-W alloy deposit is one of the best alternatives to hard chromium plating because of its good mechanical properties (high hardness, high strength, and good wear resistance). Ni-W alloy is deposited from weakly acidic or alkaline electrolytic bath with nickel sulfate, sodium tungstate or APT, and some kinds of organic hydroxy-acid complex and ammonia salts.

W content of the deposit can be changed from 0 to 50wt% and the coating with high W content is more attracted. But, meanwhile, the deposited layers are always found high internal stress, which cause them to become brittle and to bond insufficiently with the substrate. On the second hand, as the W content is increased, the current efficiency reduced, which results in large quantities of hydrogen evolution and then produces bubbles on surface and pitting appearance

In this paper, the influence of some additives on Ni-W alloy electroplating was investigated by means of compositional analysis and SEM. The initial results showed that 2-butyne-1,4-diol was the best brightener for Ni-W plating process. It could brighten and level deposit, but decreased the cathodic current efficiency. Its optimum concentration range is from 0.1g/L to 0.5g/L. Besides, three kinds of additives including 2-butyne-1,4-diol were examined with Dagguchi method.