(AA17: ALD Applications Poster Session)

MAPS (Mecaro's Advanced Precursors System): Atomic Layer Deposition of TaN and NbN Thin Films using Noble Metal Precursors

WOORI BAE, SEONGHAK CHEON, HOHOON KIM, MINSUNG KIM, SEUNGWON HA, JEUMJONG KIM, YOUNGHUN BYUN*

Mecaro Ltd.

Address : 261, Wonnamsandan-ro, Wonnam-myeon, Eumseong-gun, Chungcheongbuk-do, Korea,

Phone : +82-10-8546-3643, e-mail :wrbae@mecaro.com

Phone : +82-10-3238-2986, e-mail :yhbyun@mecaro.com

New materials are needed to meet the requirements of the continuous downscaling of microelectronic devices. The copper-based interconnects in the next generation ultra large scale integration (ULSI) microelectronics is creating significant challenges for new barrier materials. Transition metal nitrides or metal silicides are considered the most promising diffusion barrier materials[1] for next generation ULSI microelectronics. In this work, tantalum and niobium nitride films were deposited with reducing agent or plasma and characterized, using newly designed MAP-Nb01 and MAP-Ta01 precursors which are characterized by various spectroscopies. The main goal of the present study was to deposit Nb and Ta metal nitride films by atomic layer deposition (ALD)[2,3] method. Films deposited by ALD have excellent conformality and large area uniformity in addition to accurately controlled film thickness.

Protonated lithium amides together with other synthetic strategies have been extensively used to generate the imido ligand, neutral niobium and tantalum complexes have been synthesized and their functionalities were used as both ancillary and reactive sites. The diffusion barrier performance and gate electrode properties of TaN and NbN will be described in some detail. After an account of the experimental details of film deposition and characterization, the results will be reported briefly.

---

[1] A.E. Kaloyeros and E. Eisenbraun, *Annu. Rev. Mater. Sci. 30 (**2000**)* 363-385.

[2] T. Suntola, *Thin Solid Films 216* (**1992**) 84-89.

[3] M. Ritala and M. Leskelä, *Nanotechnology 10* (**1999**) 19-24.