Session: AF-MoP74	Atomic Layer Deposition of Yttrium Oxide Films and their Properties of Water Wettability	**Abstract # 2320**

Author(s)	***Presenter***	***Correspond***
Bo Zhao; Ghent University, Belgium	***X***	
Felix Mattelaer; Ghent University, Belgium		
Geert Rampelberg; Ghent University, Belgium		
Jolien Dendooven; Ghent University, Belgium		
Christophe Detavernier; Ghent University, Belgium		***X***

Abstract: (SUPPLEMENTAL DOCUMENT was submitted with the abstract)

Atomic layer deposition (ALD) of yttrium oxide (Y_2O_3) is investigated, using the liquid precursor $Y(EtCp)_2$(iPr-amd) as the yttrium source in combination with H_2O, O_2 plasma and H_2O plasma. Saturation is confirmed for each investigated reactant. The saturated GPC is 0.74 Å/cycle, 0.83 Å/cycle and 1.03 Å/cycle for H_2O, O_2 plasma and H_2O plasma, respectively (Figure 1). The three processes exhibit a similar ALD window from 150 to 300 ˚C (Figure 2a). All the as-deposited Y_2O_3 films are pure (with C and N impurity levels below 0.5 at. %), smooth and with a polycrystalline cubic structure (Figure 2b), while the densities for the plasma-enhanced processes (O_2 plasma and H_2O plasma) are slightly higher than that of the thermal process .

The as-deposited Y_2O_3 films are hydrophobic with water contact angles over 90°. The water contact angle gradually increased and the surface free energy gradually decreased as film thickness increased, reaching a saturated value at Y_2O_3 film thickness of about 20nm. The hydrophobicity was retained during post-ALD annealing at 500 °C in static air for 2 h. Exposure to polar and non-polar solvents influences the Y_2O_3 water contact angle. The reported ALD process for Y_2O_3 films may find potential applications in the field of hydrophobic coatings.

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