Deposition of Thermally Stable Polybenzimidazole (PBI) Thin Films by Molecular Layer Deposition Technique

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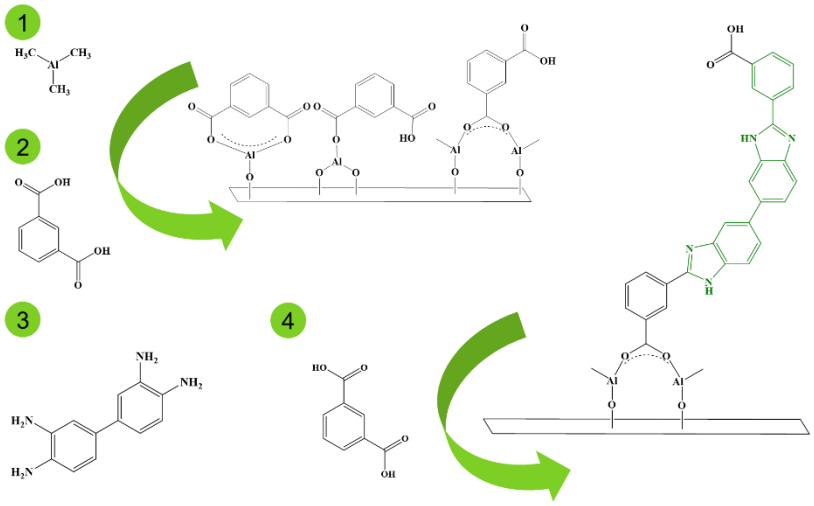
Isophthalic acid (IPA), 3, 3'-diaminobenzidine (DAB) were used as monomers and TMA was used as a promoting precursor in this process (Scheme1). The films were smooth with a low degree of roughness (500 nm x 500 nm, Rq=0,48 nm for 1µm thick film) (Figure 1). The PBI thin film growth rate was 6.0 Å/cycle (Figure 2).



Scheme 1. Schematic representation of hypothesized MLD of the PBI on a substrate surface.

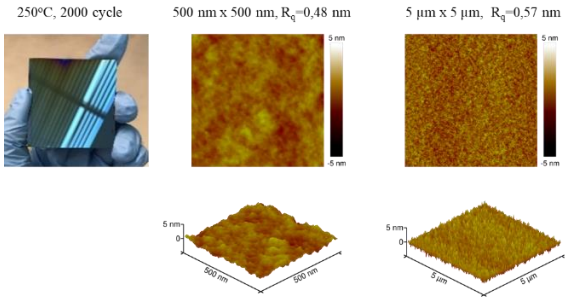


Figure 1. AFM magnification images of the 1µ thick PBI film, the film was deposited at 250 ºC with 2000 cycles on Si substrate.

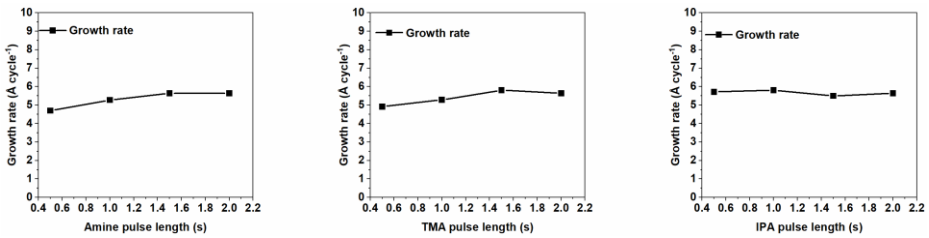


Figure 2. Self-limiting behaviour of each precursor by varying the pulse lengths.