Enhanced thermal ALE of aluminum oxide combined with ALD for UV optical applications

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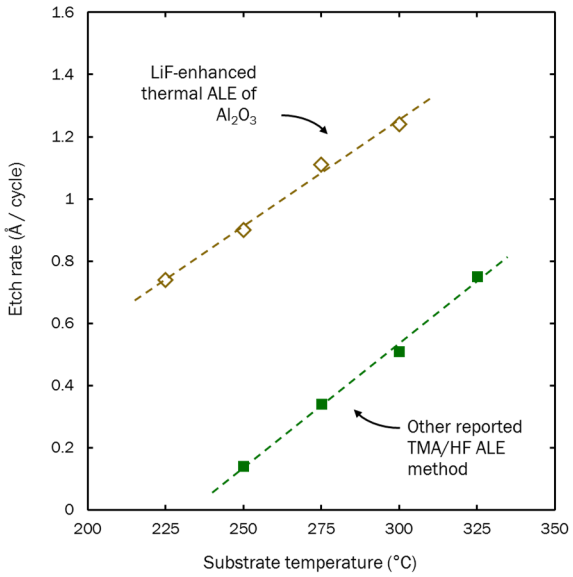

Fig. 1. The measured etch rate of ALD Al_2O_3 as a function of substrate temperature for alternating exposure to trimethyaluminum and HF in the presence of a background passivation of LiF. This is compared to an existing report of thermal ALE using similar chemistry.[Lee *et al.* Chem. Mater. 2016, 28, 2994]

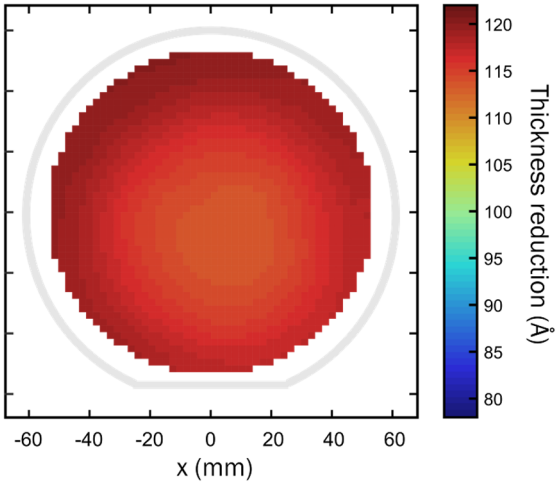

Fig. 2. The measured spatial variation of etching uniformity for 125 mm silicon wafers pre-coated with ALD Al_2O_3 for 100 ALE cycles of the LiF-enhanced process. Post etch thickness uniformity is 1.8%.

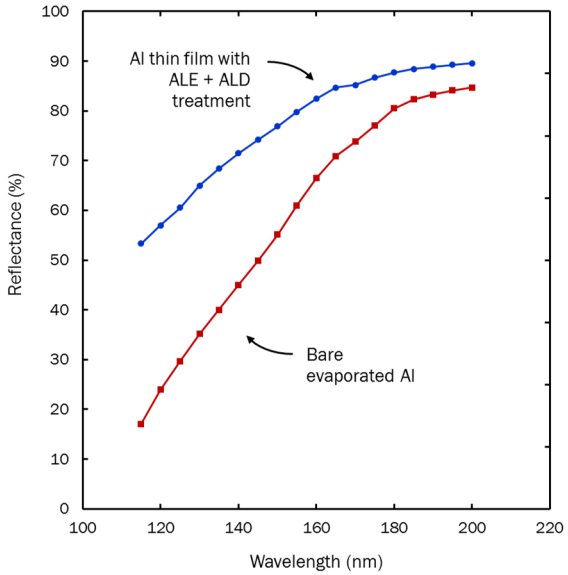

Fig. 3. Significant enhancement in the measured ultraviolet reflectance of prototype Al mirrors fabricated with the LiF-enhanced ALE procedure followed by ALD AlF_3 deposition to 'replace' the surface native oxide with fluoride.