# SUPPORTING INFORMATION

# Plasma-enhanced atomic layer deposition: a gas-phase route to hydrophilic, glueable polytetrafluoroethylene

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## Experimental Section

$Al_2O_3$ was deposited on polytetrafluoroethylene (PTFE) via thermal and plasma-enhanced atomic layer deposition ((PE-)ALD) carried out in a home-built ALD setup equipped with a turbo pump, a remote radio frequency (RF) plasma source and in situ FTIR diagnostics. The PTFE substrates were provided by Europlasma, Belgium, and were used as-received without any specific pretreatment. To prevent outgassing from the PTFE substrates during the depositions, the samples were first heated at 150 °C inside the vacuum chamber until a stable base pressure of $10^{-6}$ mbar was reached. Thermal ALD was performed at 150 °C by exposing the samples sequentially to trimethylaluminium (TMA) and water. In PE-ALD, oxygen gas was activated in a 200 W RF plasma and used as the reactant instead of water. PTFE is a chemically non-reacting and hydrophilic substrate. Because of these reasons, a static exposure mode was applied during the TMA and water half-cycles, meaning that the valves to the pumping system were closed while exposing the PTFE samples to the precursor or reactant vapour. Typical ALD cycles were as follows, for the thermal ALD process: 3s TMA pulse/10s exposure/60s pumping/3s water pulse/10s exposure/60s pumping, and for the PE-ALD process: 3s TMA pulse/10s exposure/60s pumping/6s oxygen pulse/30s pumping.

Scanning electron microscopy (SEM) and energy dispersive X-ray (EDX) spectroscopy were carried out using a FEI Quanta 200 FEG-SEM. Before imaging, the specimens were coated with a thin gold layer via sputtering. Water contact angle measurements were performed with an Advex instrument and 10 µl droplets were used.