

Scheme 1. Catalytic ALD of alumina-silica thin films using trimethylaluminum and tris(*tert*-pentoxy)silanol. Main reactions taking place during one cycle of catalytic ALD with indexed steps of TMA adsorption (a), TPS reaction with methyl aluminum (b), TPS diffusion to the aluminum center and bottom-up growth of siloxane chains (c) and self-limitation of TPS diffusion by crosslinking of siloxane chains and gelation into silica (d).

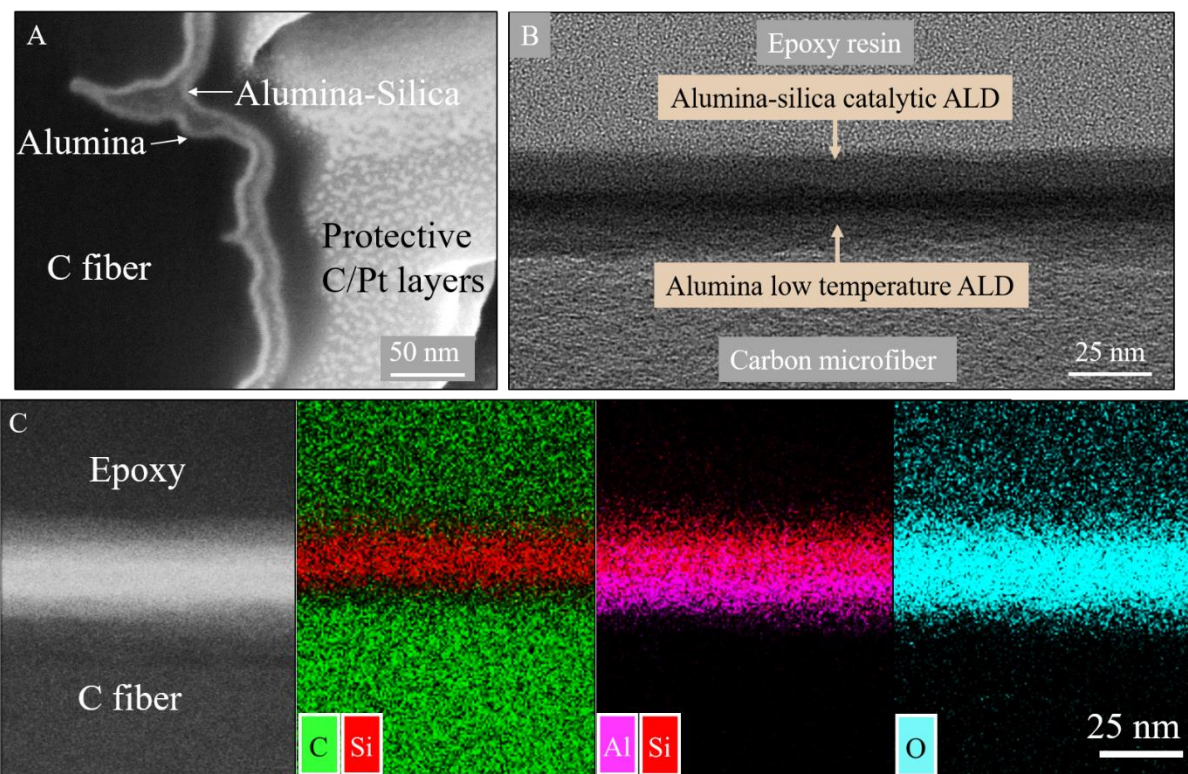


Figure 1. Alumina ALD and alumina-silica catalytic ALD on carbon microfibers. SEM (a) and BF-TEM (b) micrographs of an alumina-coated carbon microfiber covered by 13 cycles of alumina-silica catalytic ALD performed at 525 K with 100 s TPS dose and 870 s post-TPS purge duration. STEM, EDX cartography (c) of the alumina-silica coated microfiber embedded in resin. From left to right: STEM image, EDX overlay of Si + C, Al + Si, and O.