

Abstract Submitted
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Al₂O₃ Conformal Coating of High-Aspect-Ratio Vertically Aligned Carbon Nanofiber Array Using Atomic Layer Deposition GARY MALEK, JUDY WU, RONGTAO LU, JIANWEI LIU, ALAN ELLIOT, LOGAN WILLE, University of Kansas Dept. of Physics & Astronomy, JUN LI, STEVEN KLANKOWSKI, Kansas State University, Department of Chemistry — A vertically aligned carbon nanofiber array (VACNFA) was used as a high-aspect-ratio substrate for atomic layer deposition (ALD) coating of aluminum oxide (Al₂O₃). Al₂O₃ was deposited on the VACNFA using alternating pulses of trimethylaluminum and distilled water for each cycle. The VACNFA was chosen as the substrate because of its large surface area as a result of the three dimensional structure and its surface reactivity due to outside dangling bonds. This reactive nature eliminated the need for functionalization of the VACNFA before ALD deposition. Transmission electron microscopy (TEM) was used to verify the Al₂O₃ layer conformally coated the VACNFA despite its high-aspect ratio. TEM images also revealed an approximate growth rate of the Al₂O₃ layer to be 0.85 Å/cycle. Therefore, we can control the thickness of the Al₂O₃ layer on the VACNFA by tuning the number of ALD cycles.

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