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**14. ABSTRACT**

Vertically-aligned nanowires are of interest for novel applications including sensing, photonics, and energy storage. Templated synthesis of such structures has been previously demonstrated via anodized aluminum oxide (AAO). However, the performance of AAO-on-Si devices has been limited by current methods of obtaining well-adhered, thick AAO templates on Si substrates. Thicker AAO templates allow for longer nanowires of active material, which is expected to increase performance of devices reliant on the surface area or volume of the active material. In this report, Al-Si eutectic bonding was used to achieve thick AAO-on-Si, with templates up to 90 μm thick bonded to the wafer. Carbon nanotubes (CNTs) were grown in the AAO templates bonded to Si to create proof-of-concept on-chip supercapacitor devices. Our devices show a promising value of 0.44 mF cm-2, much higher than previous AAO-on-Si capacitors. The structure of the CNT/AAO/Si stack is examined using SEM and TEM, and the device performance is tested through cyclic voltammetry (CV), electrochemical impedance spectroscopy (EIS), and galvanostatic charge-discharge (GCD) measurements.

**15. SUBJECT TERMS**
AAO(anodized aluminum oxide), supercapacitor, on-chip, CNT(carbon nanotube), ionic liquid

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