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A Novel Nanotube-on-Insulator (NOI) Approach toward Single-Walled Carbon Nanotube Devices CHONGWU ZHOU, XIAOLEI LIU, DAIHUA ZHANG, University of Southern California — We present a novel nanotube-on-insulator (NOI) approach to produce high-yield nanotube devices based on aligned single-walled carbon nanotubes. First, we managed to grow aligned nanotube arrays with controlled density on crystalline, insulating sapphire substrates, which bear analogy to industry-adopted silicon-on-insulator substrates. Based on the nanotube arrays, we demonstrated registration-free fabrication of both top-gated and polymer-electrolyte-gated field-effect transistors with minimized parasitic capacitance. In addition, we have successfully developed a way to transfer these aligned nanotube arrays to flexible substrates. Our approach has great potential for high-density, large-scale integrated systems based on carbon nanotubes for both micro- and flexible electronics.

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