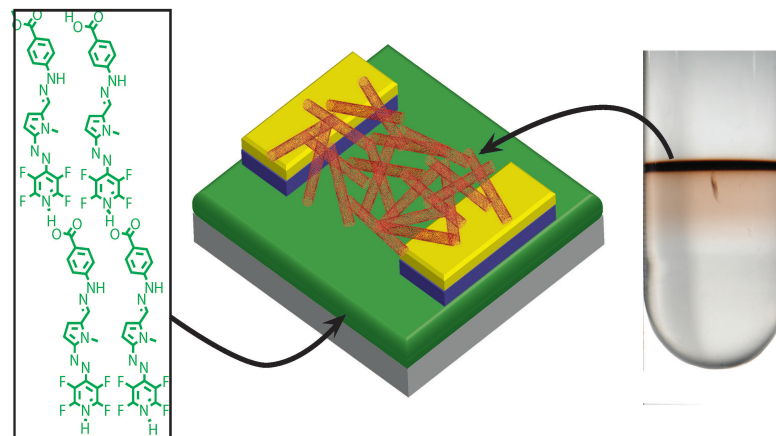


High Performance Carbon Nanotube Thin-Film Transistors Enabled by Hybrid Molecular Dielectrics

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Over the past decade, semiconducting carbon nanotube (CNT) thin films have been recognized as contending materials for a wide range of applications in electronics, energy, and sensing. Nevertheless, CNT transistor performance suitable for real-world applications awaits understanding-based progress in the integration of independently pioneered device components. We achieve this here by integrating high-purity semiconducting CNT films with a custom-designed hybrid inorganic-organic gate dielectric. This synergistic combination of materials results in concurrent advances in several performance metrics such as transconductance, mobility, sub-threshold swing, and on/off ratio, while also achieving hysteresis-free operation in ambient conditions.



Hybrid molecular self-assembled dielectrics enhance the performance of thin-film transistors based on semiconducting carbon nanotubes isolated by density gradient ultracentrifugation.

