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Transport/magnetotransport of high-performance graphene transistors on organic molecule-functionalized substrates SHAO-YU CHEN, Academia Sinica, PO-HSUN HO, National Taiwan University, REN-JYE SHIUE, Academia Sinica, CHUN-WEI CHEN, National Taiwan University, WEI-HUA WANG, Institute of Atomic and Molecular Sciences, Academia Sinica, Taiwan — We present the transport and magnetotransport of high-quality graphene transistors on conventional SiO₂/Si substrates by modification with organic molecule self-assembled monolayers (SAMs). Graphene devices on organic SAM-functionalized substrates exhibit high carrier mobility, low intrinsic doping, suppressed carrier scattering, and reduced thermal activation of resistivity at room temperature. Magnetotransport of graphene devices with pronounced quantum Hall effect and Shubnikov-de Haas oscillations also confirms the high quality of graphene on this ultrasmooth organic SAM-modified platform. The high-performance graphene transistors on the solution-processable SAM-functionalized SiO₂/Si substrates are promising for the future development of large-area and low-cost fabrications of graphene-based nanoelectronics.

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