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High-speed, sub-15 nm feature size thermochemical nanolithography[1] ELISA RIEDO, ROBERT SZOSZKIEWICZ, School of Physics, Georgia Tech, TAKASHI OKADA, SIMON JONES, School of Chemistry and Biochemistry, TAI-DE LI, School of Physics, WILLIAM KING, Woodruff School of Mechanical Engineering, SETH MARDER, School of Chemistry and Biochemistry, SCHOOL OF PHYSICS, GEORGIA TECH COLLABORATION, SCHOOL OF CHEMISTRY AND BIOCHEMISTRY, GEORGIA TECH COLLABORATION, WOODRUFF SCHOOL OF MECHANICAL ENGINEERING, GEORGIA TECH COLLABORATION — The past decade has witnessed an explosion of techniques used to pattern materials on the nano and submicrometer scale, driven by a diversity of applications, such as molecular electronics, data storage, optoelectronics, displays, and all forms of sensors. However, there are many challenges to conventional techniques as they are approaching their fundamental size limit. Here we report a nanolithography technique that allows simultaneous direct control of the local chemistry and topography of thin polymer films. Specifically, a heated atomic force microscope tip can write sub-15 nanometer hydrophilic features over a hydrophobic polymer at the rate of 1.4 millimeters per second. This method is simple, direct, extremely rapid, achievable in a range of environments, and easily adaptable to other materials systems.

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