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Functional gradients with controlled steepness on self-assembled aminosilane monolayers YING ZOU, STEVE STORY, SHANE HARTON, HARALD ADE, Department of Physics, North Carolina State University, Raleigh, NC 27695 — A high throughput, and cost-effective way to fabricate functional gradients of controlled steepness (up to $\sim$10μm for full gradient) on organic self assembled monolayer (SAM) films has been achieved. The exposure of a aminopropyltriethoxylsilane(APTES) film prepared on a SiOx substrate to ultraviolet (UV) light, with and without the creation of ozone, is controlled by a movable shutter that shadows the sample from the UV source. The shutter to the substrate spacing sets a lower limit to the steepness of the gradient, whereby both the diffusion field of ozone and the divergence of incident UV light are responsible. Through the attachement of 0.26 μm sized polystyrene (PS, carboxyl-group ended) microspheres (MSs) onto the exposed APTES films via chemical reaction in an activated MS suspension, the fabricated gradient can be visualized directly with a visible light microscope operated in Normarsky interference mode. The short MS density-saturation time observed suggests that covalent bonding is established between the MSs and the APTES film through the reaction of carboxyl- with amine- groups [1]. The use of a linar, variable shutter speed in conjuction with the saturation time allows for the variation and control of the gradients steepness. Reference: [1] S. Herrwerth et al Langmuir 19(2003) 1880-1887

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