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UV Induced Photopatterning of Poly-L-Lysine and Photodegradation of Ppolymethylmetacrylate JEAN MICHEL TAGUENANG, ASCHALEW KASSU, REDAHEGN SILESHI, FERNANDO CALZZANI, ANUP SHARMA, Alabama A&M University — We present the effects of UV irradiation on two different organic polymers. In the first part, deep UV lithography on poly-L-lysine thin films is used to generate microarrays with enhanced hydrophilicity. This is manifested as adsorption of ambient humidity from air by areas exposed to UV fluence around 5 J/cm2 and is made visible by phase-contrast microscopy. Kinetics of adsorption is investigated by a novel technique involving fabrication of submicrometer hydrophilicity grating by two-beam UV interferometry. In an aqueous colloidal medium, gold and polystyrene microspheres preferentially attach to areas that are relatively less hydrophilic, i.e., those areas not exposed to UV light. This provides a method for fabricating micro- and nanoporous arrays with controlled porosity. Laser-induced fluorescence, Raman and absorption spectroscopies are used to investigate reversible degradation of transmission in PMMA optical fibers. When exposed to 254 nm light, transmission of PMMA fiber in 400–800 nm range shows a significant change in attenuation. Over a period of 10 days following UV exposure, transmittance of the plastic fiber recovers to a significant fraction of its pre-exposure value. Exposed exhibits strong laser-induced fluorescence with 488 nm laser which spans from 450 nm to 750 nm and peaks at 580 nm.

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