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White Light Pump-Probe Photothermal Mirror Spectrophotometer MAY HLAING, ARISTIDES MARCANO, Delaware State Univ — We develop a new kind of spectrophotometer based on the photothermal mirror effect. The absorption of a focused tunable pump light by first atomic layers of the sample's surface generates a nanometric surface distortion or bump of thermal origin. A probe beam of light of fixed wavelength and with spot dimensions much larger than the pump beam's spot is used to test this thermal distortion. Changes in the wave-front of the reflected probe beam yields changes of the diffraction pattern of the reflected beam at the far field which can be used to produce a signal proportional to the amount of released heat. Tuning of the wavelength of the pump field generates a photothermal mirror spectrum. As tunable pump source we use the light from a Xenon arc-lamp filtered using a series of interference filter. This way we generate tunable pump light in the spectral region of 370-730 nm with a HWHM of 5 nm and power density of the order of tens of microwatts per nanometer. We obtain photothermal mirror spectra of metallic surfaces and other non-transparent samples. We show that these spectra are fundamentally different from the usual reflectance spectra which measure the percentage of the total of the total energy reflected by the surface.

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