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## The Characteristics of Molecular Conjugated Optical Sensor Based on Silicon Nanowire FET

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Silicon nanowire devices fabricated by bottom-up methods are attracted due to their electrical, mechanical, and optical properties. Especially, to functionalize the surface of silicon nanowires by molecules has received interests. The changes in the characteristics of the molecules is delivered directly to the surface of the silicon nanowires so that the silicon nanowire can be utilized as an efficient read-out device by using the electronic state change of molecules. The surface treatment of the silicon nanowire with light-sensitive molecules can change its optical characteristics greatly. In this paper, we present the optical response of a SiNW field-effect-transistor (FET) conjugated with porphyrin molecules. We fabricated a SiNW FET and performed porphyrin conjugation on its surface. The characteristic and the optical response of the device shows a large difference after conjugation while there is not much change of the surface in the SEM observation. It attributed to the existence of few layer porphyrin molecules on the SiNW surface and efficient variation of the surface potential of the SiNW due to light irradiation.

**Keywords:** Silicon nanowire, Molecule, Surface treatment