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Structural and Optical Properties of Metals in Photonic Semiconductor Devices MENG-MU SHIH, University of Florida — Metals can play important roles in semiconductor photonics if properly incorporated and designed. The mode-coupling coefficient of the periodic waveguide in the device is the key parameter for analyzing optoelectronic performance. This work constructs a modified model to show how the metal gratings on the semiconductor surfaces and how the metal compositions inside the semiconductors can affect the coupling coefficients. Metal gratings with various materials and nano-structures can affect optical interactions at corrugated metal-semiconductor interfaces. Optical effects such as wavelength and wave polarization can affect the optical properties of metals and semiconductors. In addition, metal compositions in semiconductor compounds can change the optical properties of semiconductors. Semiconductors with different optical and structural properties can generate specific wavelengths. Consequently, the above factors related to optical properties and interactions of metals can affect the coupling coefficients. Computational results with physical interpretations provide insights into photonic devices for more applications.

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