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Second-Harmonic Generation Interference on Transition-Metal Dichalcogenide – ZnO NanowireHybrid Structures

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Abstract

The nonlinear optical (NLO) properties of any given material are described by the complex tensor, which is a complex number. By measuring the intensity of an emission, the absolute square of the electric field, the complex information gets lost. Combining two materials leads to interference between the SHG signals of both. This effect is dependent on the phase mismatch angle. By choosing the materials such that the resonances of the materials do not overlap we were able to fix the phase mismatch angle to the complex angle of the probed resonances. With this we obtained the absolute value and the complex angle of the nonlinear susceptibility of the probed resonance, therefore being able to measure the real and the imaginary part of it. We exploited the symmetry properties of the transition-metal dichalcogenide to turn the interference on and off and in addition exploited the polar properties of the ZnO nanowire to flip the interference from constructive to destructive. As results, polarization resolved and wavelength dependent SHG will be presented.