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## The impact of the substrate material on the optical properties of 2D WSe<sub>2</sub> monolayers

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2D-materials, especially transition metal dichalcogenides (TMDs) have drawn a lot of attention due to their remarkable characteristics rendering them a promising candidate for optical applications. While the basic properties are understood up to now, the influence of the environment has not been studied in detail, yet. Here we highlight a systematic comparison of the optical properties of tungsten diselenide monolayers on different substrates. Subtle changes in the emission spectrum and Raman signature have been found as well as surprisingly pronounced differences in the pump-power-dependent and time-resolved output at higher excitation densities. For all samples, exciton–exciton annihilation can be obtained. Nevertheless an analysis of different pump-dependent decay rates suggests

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