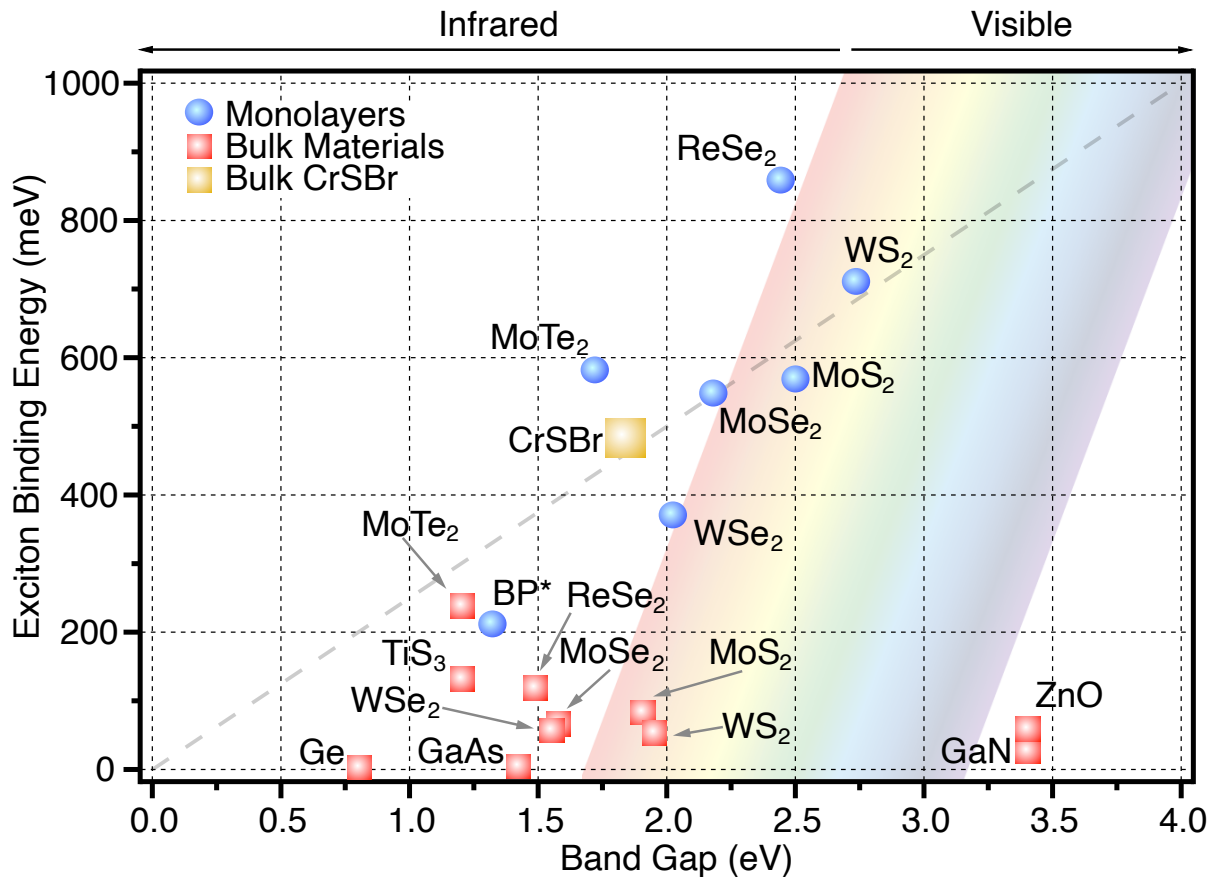




Plot of the exciton binding energy versus the electronic band gap for various monolayer and bulk semiconductors. For the bulk transition metal dichalcogenides (TMDs), the gap at the K point (which is the relevant transition for the excitons) is plotted instead of the indirect gap. For all the other materials, the direct band gaps are used. For CrSBr, the gap plotted is the lower bound on the direct electronic gap found through our pristine ARPES measurements. The rainbow background represents the spectrum of the exciton energy (optical gap) for a given electronic gap and exciton binding energy. Notably, bulk materials have an exciton binding energy below 250 meV except for bulk CrSBr, which has a binding energy similar to those for monolayer TMDs. The gray dashed line plots the trend for monolayer semiconductors which bulk CrSBr roughly obeys. All data points are from experimental works. The measurements for anisotropic black phosphorous (BP) were performed on a bilayer, hence the asterisk.

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