

Supplementary information for Valley polarization of exciton-polaritons in monolayer WSe₂ in a tunable microcavity

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Operation of the empty cavity at cryogenic temperature

The operation of the empty cavity (no WSe₂ monolayer inside) at 5 K is presented in Fig. S1. In the reflectance spectra shown in Fig. S1a, the cavity mode is visible as a narrow dip in the photonic stop-band around 1.754 eV. As can be seen, with the external voltage applied to the chip, the position of the cavity mode shifts towards higher energies. Importantly, the tuning of the cavity has no significant impact on the cavity's quality factor, which at normal incidence is close to 160. In the angle-resolved experiment, realized by means of Fourier-plane imaging of a high-numerical-aperture ($NA = 0.55$) microscope objective, the reflectance spectra display a typical, parabolic-like energy vs observation angle dependence shown in Fig. S1b–g. A blueshift of the cavity mode with the voltage polarizing the piezoelectric chip is clearly visible.

We note that the piezoelectric chip is used only for fine adjustment of the cavity width during the experiments at low temperatures. The initial distance between the mirrors is set roughly before the cooling down process, during which the cavity width significantly decreases due to a thermal contraction of the holder. For that reason the cavity width and relationships between bias applied to the piezoactuator and the detuning varies between the succeeding experiments.

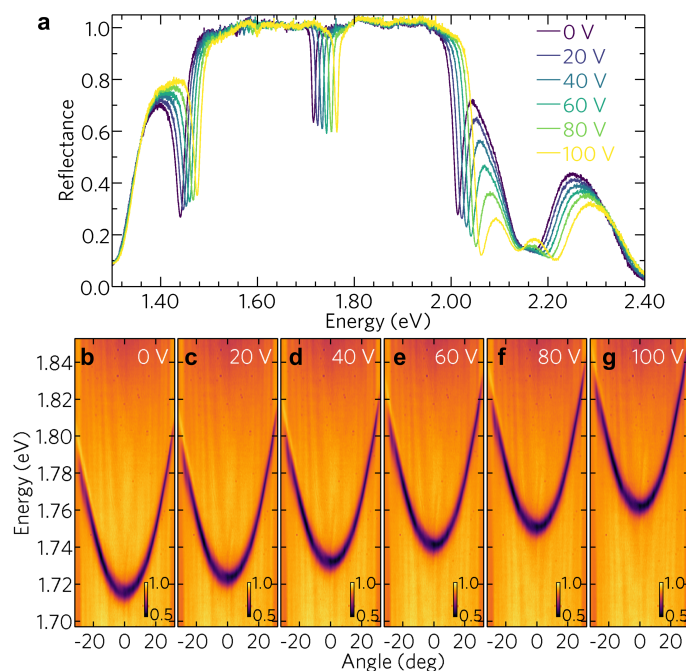


Fig. S1 Reflectance from an empty cavity at 5 K. **a** Reflectance spectra at normal incidence for different voltages applied to the piezoelectric chip, **b–g** corresponding angle-resolved reflectance spectra for the cavity mode.