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Photoluminescent property of exfoliated $CrCl_3$ flake

Optical properties of semiconducting layered materials, such as transition metal dichalcogenides and black phosphorus, have been intensively studied due to their fascinating features including excitonic states, dramatic thickness dependence, and valley-selective phenomena [1][2]. Recently, optical response of exfoliated magnetic insulator also started to be investigated as the research on 2D van der Waals magnets has rapidly developed. According to the recent study, exfoliated CrI3 shows the clear photoluminescence from their d-d transition, and its helicity clearly reflects the versatile magnetic order [3].

Here we report the photoluminescent properties of exfoliated $CrCl_3$, layered antiferromagnetic insulator (Fig. 1). We confirmed $CrCl_3$ shows photoluminescence even in exfoliated thin flake and investigated its properties in detail (Fig. 2). The observed features especially in thickness dependence can directly reflect the optical transition inside CrCl3, and their origin will be discussed in our presentation.

References

[1] Andrea Splendiani, et al., Nano Letter, 10 (2010) 1271-1275
[2] Likai Li, et al., Nature Nanotechnology, 12 (2017) 21-25
[3] Kyle L. Seyler, et al., Nature Physics 14 (2018) 277-281

Figures

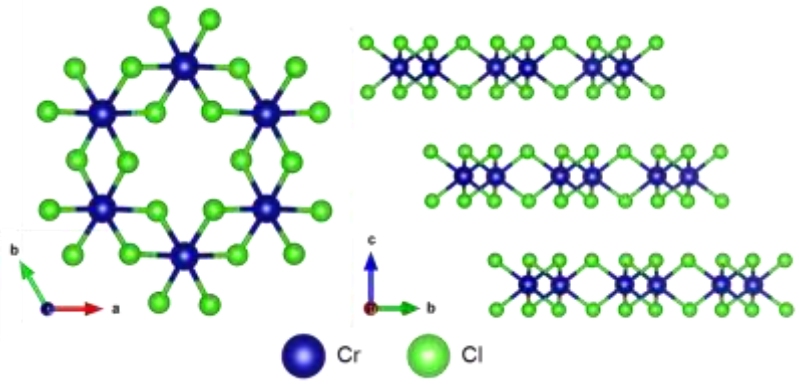

Figure 1: Top view (left) and side view (right) of $CrCl_3$.

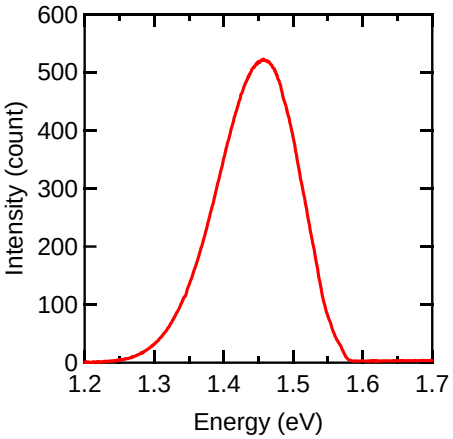

Figure 2: Photoluminescence spectra of exfoliated $CrCl_3$ at 30 K.