Difference between X-ray and UV excited photoluminescence on layered GaSe

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Abstract

Nano focusing hard x-ray at Taiwan Photon Source (TPS) 23A has been used to exam the luminescence property of GaSe, a layered and been claimed with fast response two-dimensional material. Difference responsibility of photoluminescence is discovered with incident x-ray located at elements absorption K-edge comparing to conventional laser excitation. Time resolved photoluminescence measurement also been taken by streak camera and prove the fast response claim by other articles. Further, we provide the elemental distribution by characteristic x-ray fluorescence of mechanical exfoliated GaSe sample and obvious intensity contrast of Ga and Se is noticed. Which might give another point of view in the describing of the degradation of two-dimensional material.