Supporting Information for:

Bandgap Regulation and Doping Modification of $Ga_{2-x}Cr_xSe_3$ Nanosheets

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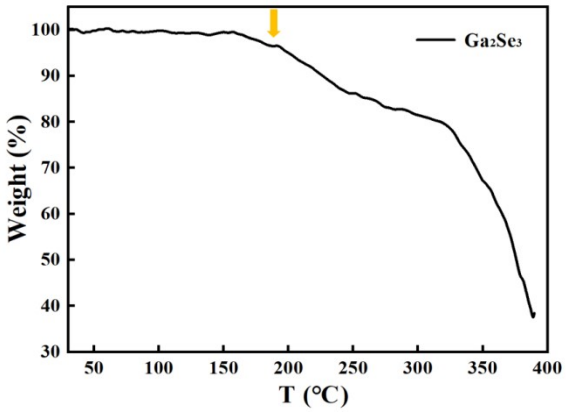

Fig. S1. Thermogravimetric analysis of Ga_2Se_3 nanoparticles.

Table S1. Unit cell parameters and unit cell volumes of Ga_2Se_3 and Ga_2Se_3 after annealing at different temperatures.

Sample	Ga_2Se_3	150 °C	200 °C	250 °C	300 °C
lattice Constant a (Å)	5.4290	5.4678	5.4832	5.4668	5.4783
Unit cell volume V $(Å)^3$	160.01	163.47	164.86	163.38	164.41
ΔV $(Å)^3$		3.46	4.85	3.37	4.40

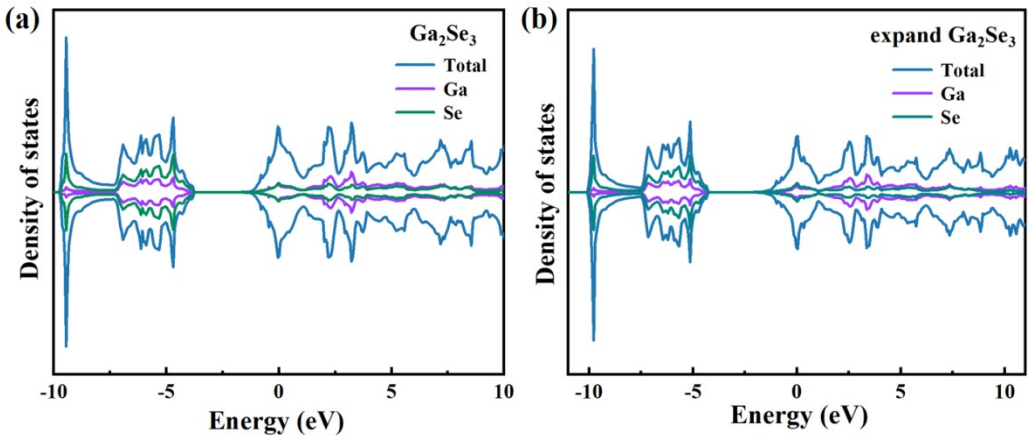

Fig. S2. Calculated DOS plots of Ga_2Se_3 and expand Ga_2Se_3 using HSE06 functional.

Table S2. Unit cell parameters and unit cell volumes of the $Ga_{2-x}Cr_xSe_3$ ($0 \leqslant x \leqslant 0.6$) nanosheets with different Cr contents

Sample	x = 0	x = 0.2	x = 0.4	x = 0.6
2θ (°)	27.94	28.03	28.37	28.67
lattice Constant a (Å)	5.4290	5.4239	5.4083	5.3935
Unit cell volume V $(Å)^3$	160.01	159.56	158.20	156.90
ΔV $(Å)^3$		0.45	1.82	3.11

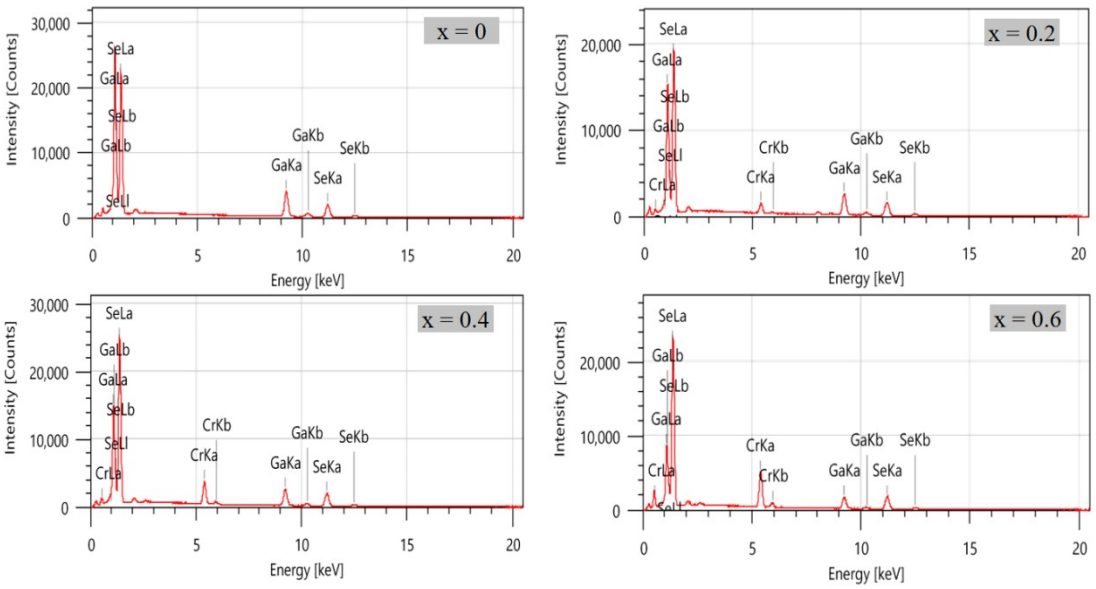

Fig. S3. EDX spectra of $Ga_{2-x}Cr_xSe_3$ ($0 \leqslant x \leqslant 0.6$) with different Cr concentrations.

Table S3. The content of Ga, Cr, Se elements in different Cr doping content (x).

Cr doping content (x)	Ga (at.%)	Cr (at.%)	Se (at.%)	(Ga+Cr)/Se
x = 0	41.75	0	58.25	41.75/58.25
x = 0.2	34.29	5.28	60.43	39.57/60.43
x = 0.4	27.46	12.30	60.24	39.76/60.24
x = 0.6	20.15	20.16	59.69	40.31/59.69

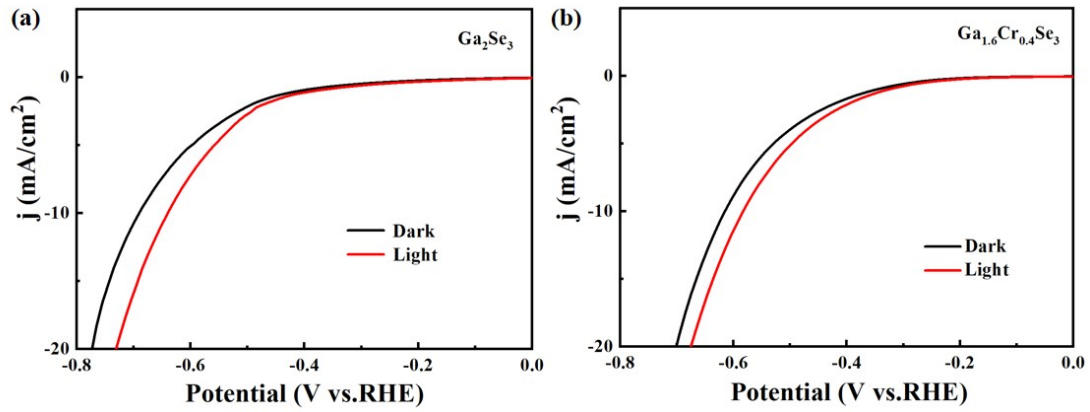

Fig. S4. LSV curves of Ga_2Se_3 and $Ga_{1.6}Cr_{0.4}Se_3$ samples under light and dark conditions.

Table S4. BET surface areas and pore properties of Ga_2Se_3 nanoparticles and $Ga_{1.6}Cr_{0.4}Se_3$ nanosheets.

Sample	BET surface area ($m^2\ g^{-1}$)	Pore volume ($cm^3\ g^{-1}$)	Pore size (nm)
Ga_2Se_3	7.9437	0.0594	18.8341
$Ga_{1.6}Cr_{0.4}Se_3$	39.1334	0.1837	12.1886