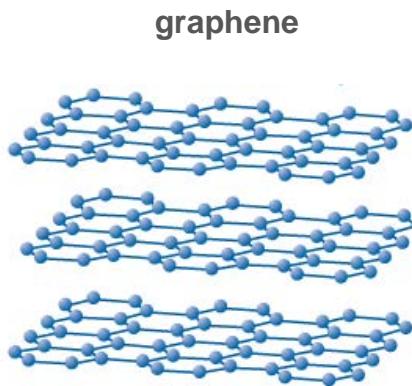
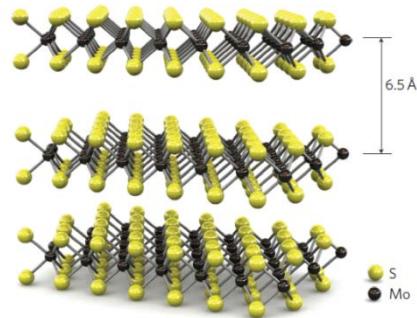


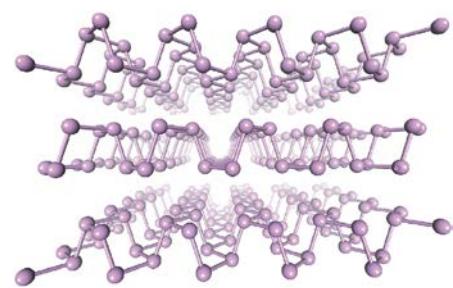
■ 2D Materials



Transition Metal Dichalcogenides



Black Phosphorus



■ Transition Metal Dichalcogenides (TMDC)

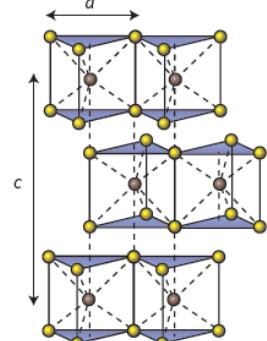
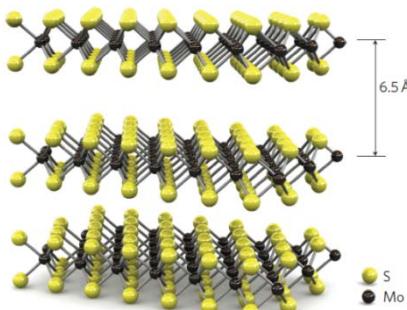
H														He			
Li	Be																
Na	Mg	3	4	5	6	7	8	9	10	11	12						
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	S	Cl	Ar
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Se	Br	Kr
Cs	Ba	La - Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac - Lr	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Fl	Uup	Lv	Uus	Uuo

MX₂
M = Transition metal
X = Chalcogen

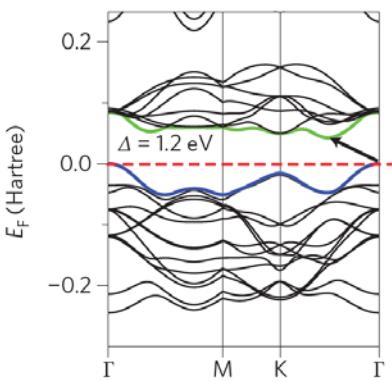
	Bandgap (eV)	Mo	W	Ti	Zr	Hf	V	Nb	Ta	Ni	Pd	Pt
S	monolayer	1.8-2.1	1.8-2.1	~0.65	~1.2	~1.3	~1.1	metal	metal	~0.6	~1.2	~1.9
	Bulk	1.0-1.3	1.3-1.4	~0.3	~1.6	~1.6	metal	metal	metal	~0.3	~1.1	~1.8
Se	monolayer	1.4-1.7	1.5-1.7	~0.51	~0.7	~0.7	metal	metal	metal	~0.12	~1.1	~1.5
	Bulk	1.1-1.4	1.2-1.5	metal	~0.8	~0.6	metal	metal	metal	metal	~1.3	~1.4
Te	monolayer	1.1-1.3	~1.03	~0.1	~0.4	~0.3	metal	metal	metal	metal	~0.3	~0.8
	Bulk	1.0-1.2	metal	metal	metal	metal	metal	metal	metal	metal	~0.2	~0.8

Molybdenum Disulfide (MoS_2)

Bulk

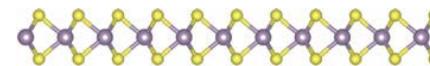
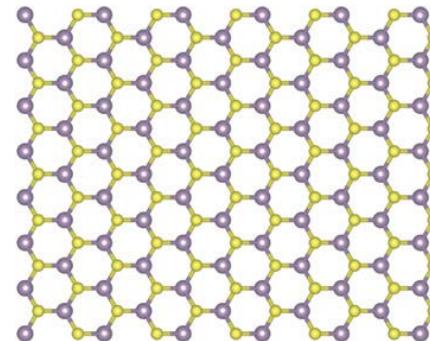


MoS_2 bulk

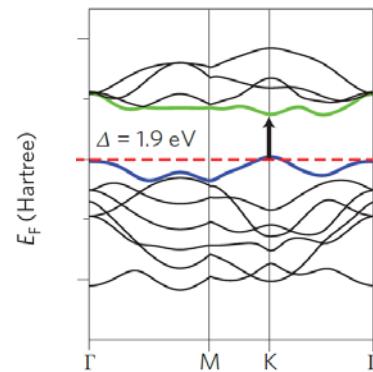


Indirect band gap

Monolayer

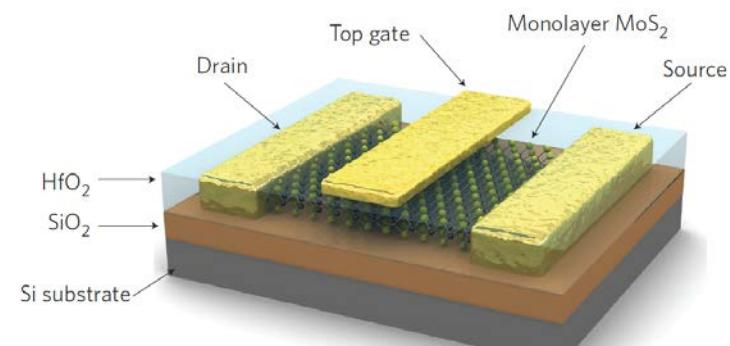
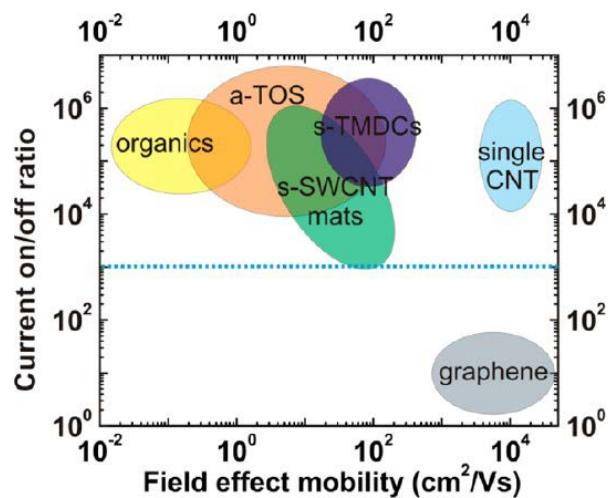


MoS_2 monolayer

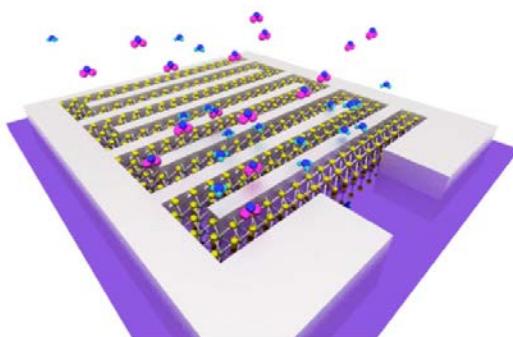


Direct band gap

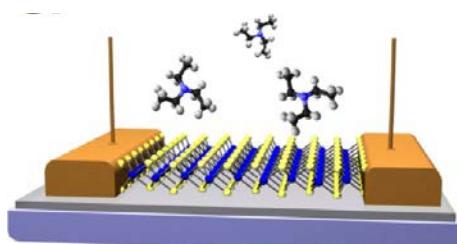
■ MoS₂ Field Effect Transistor (FET)



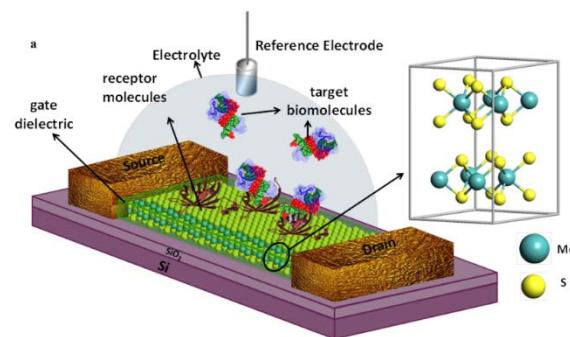
MoS₂ FET



MoS₂ gas sensor



MoS₂ organic material sensor



MoS₂ bio-sensor