Switchable diode in BiFeO3

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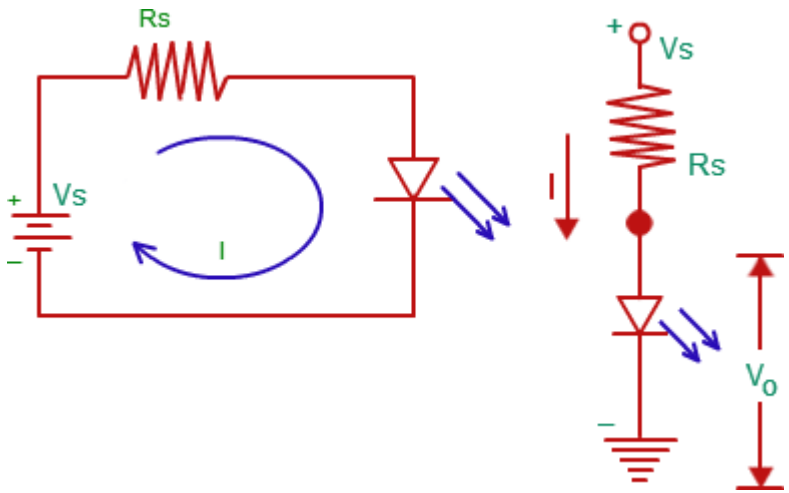
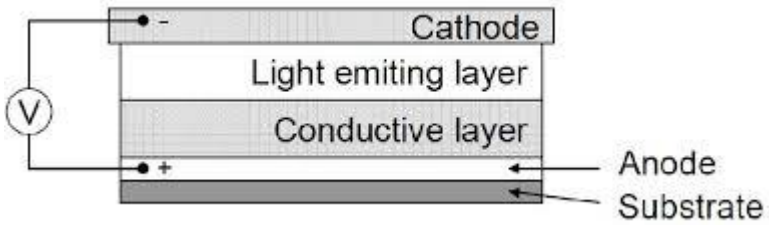
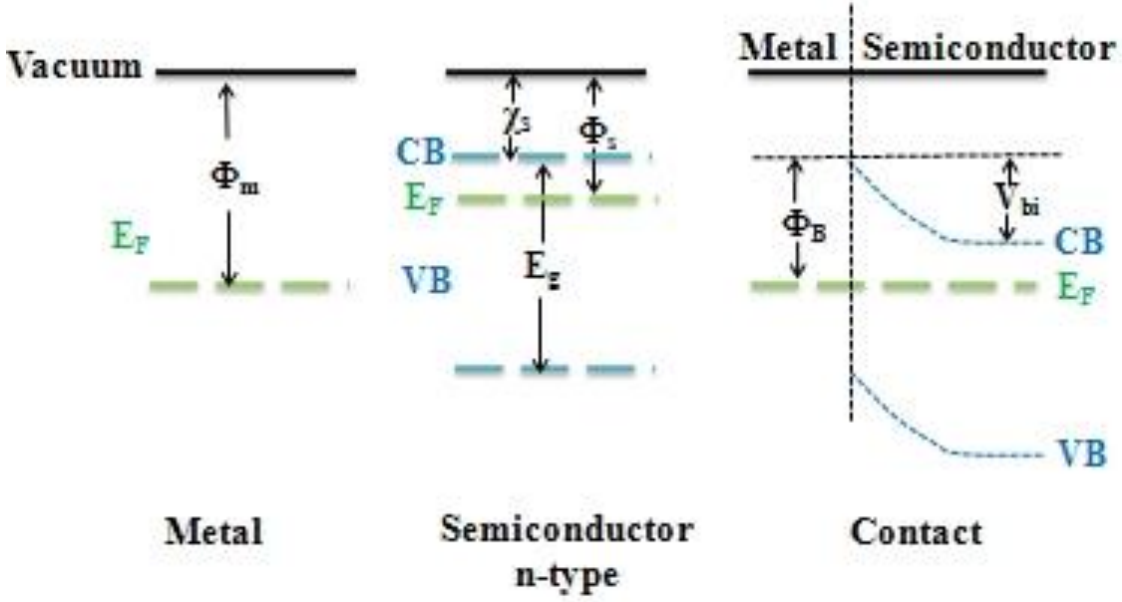
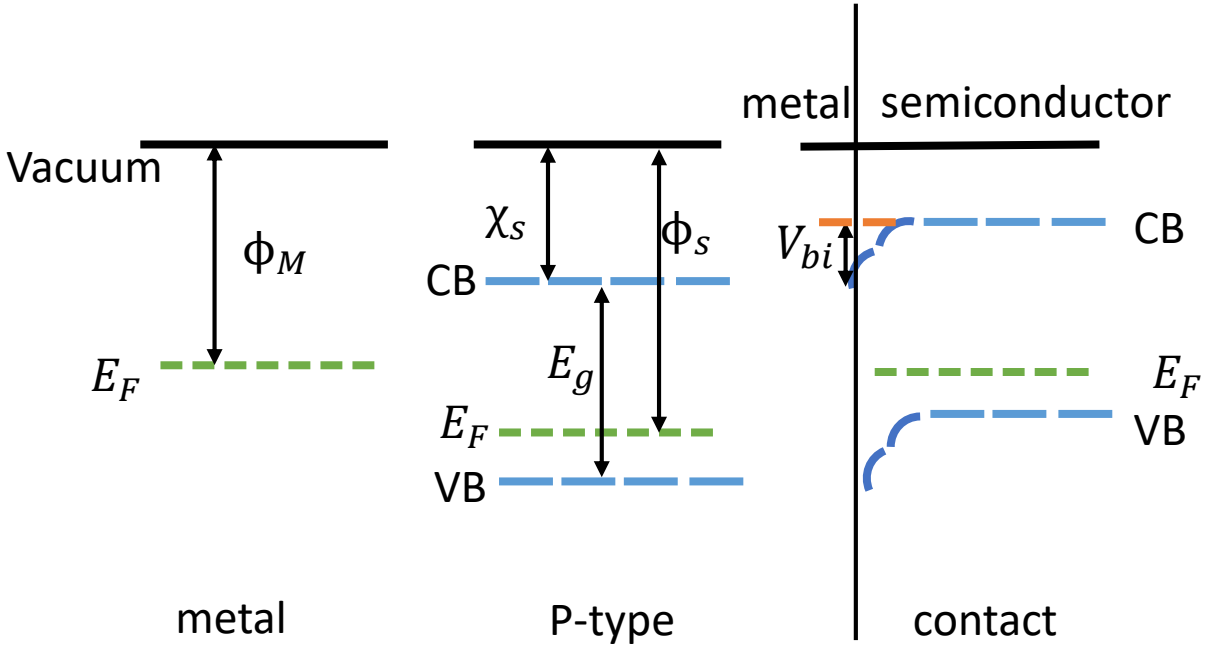
Light emitter diode



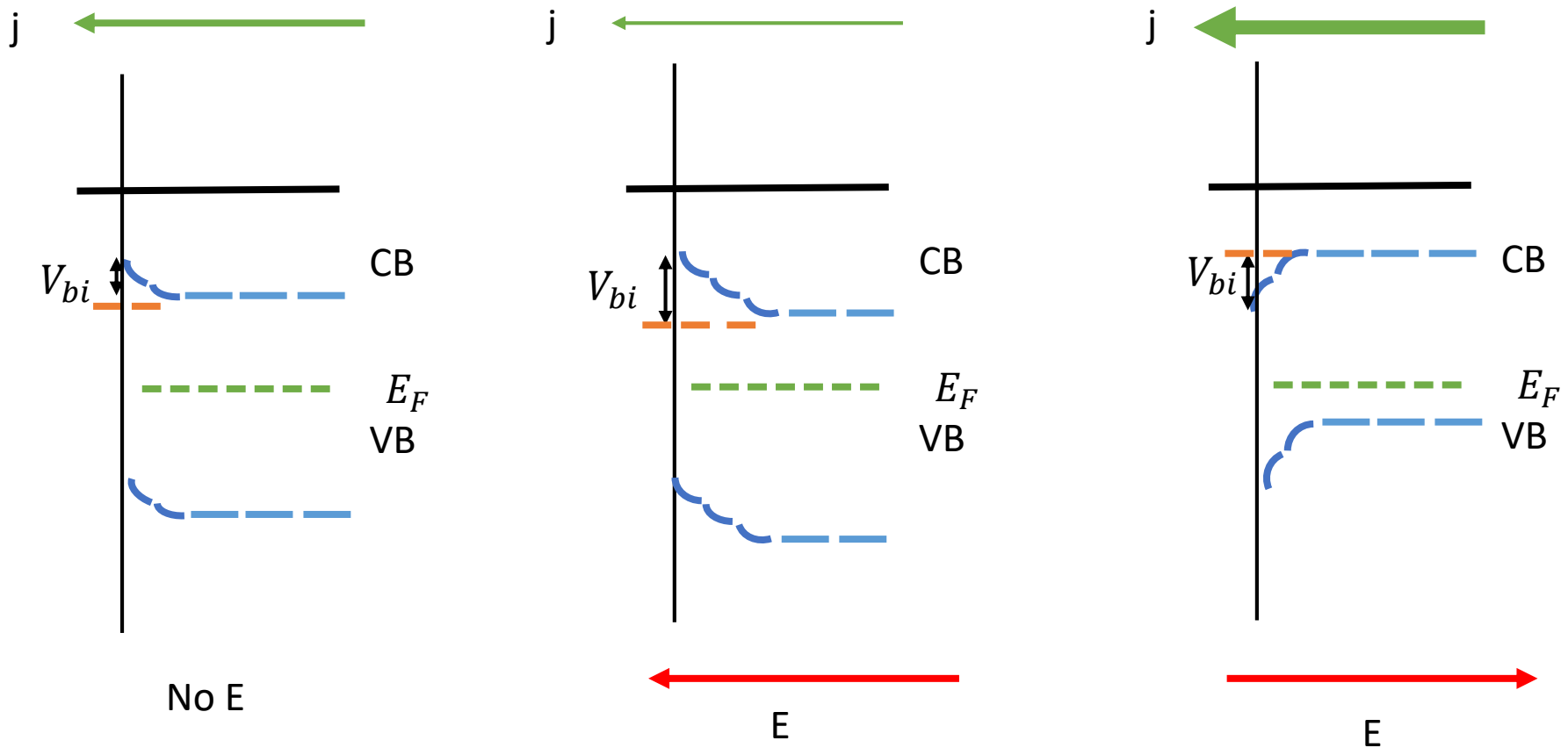


Schottky barrier between metal and semiconductor

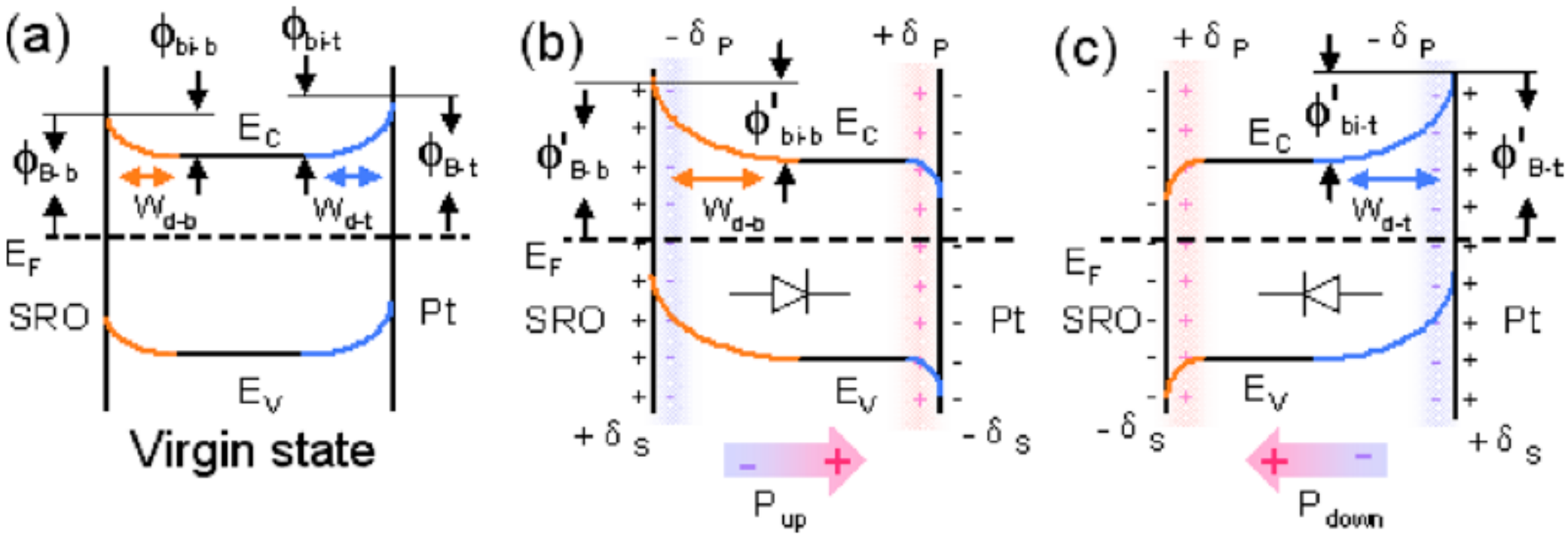




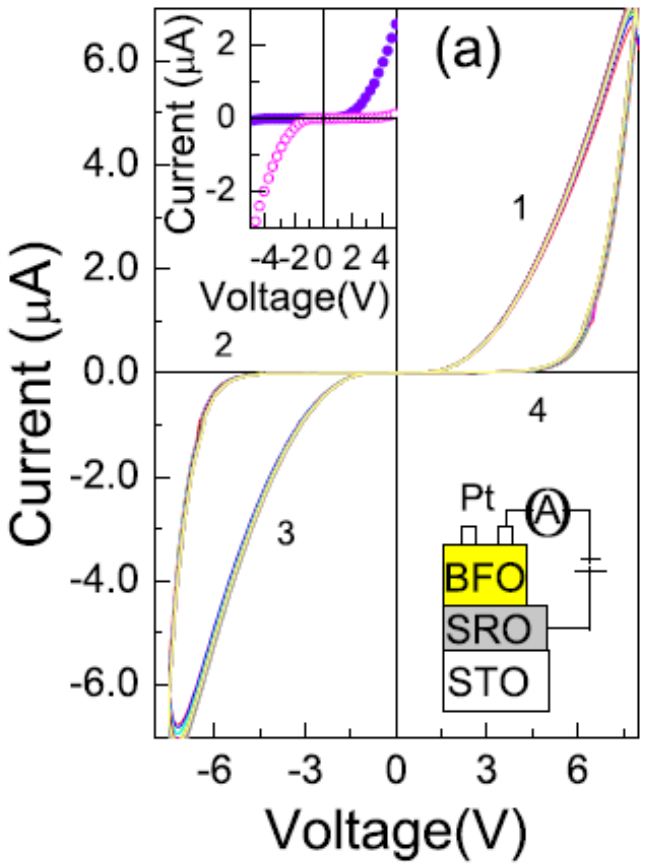
Schottky barrier in electric field

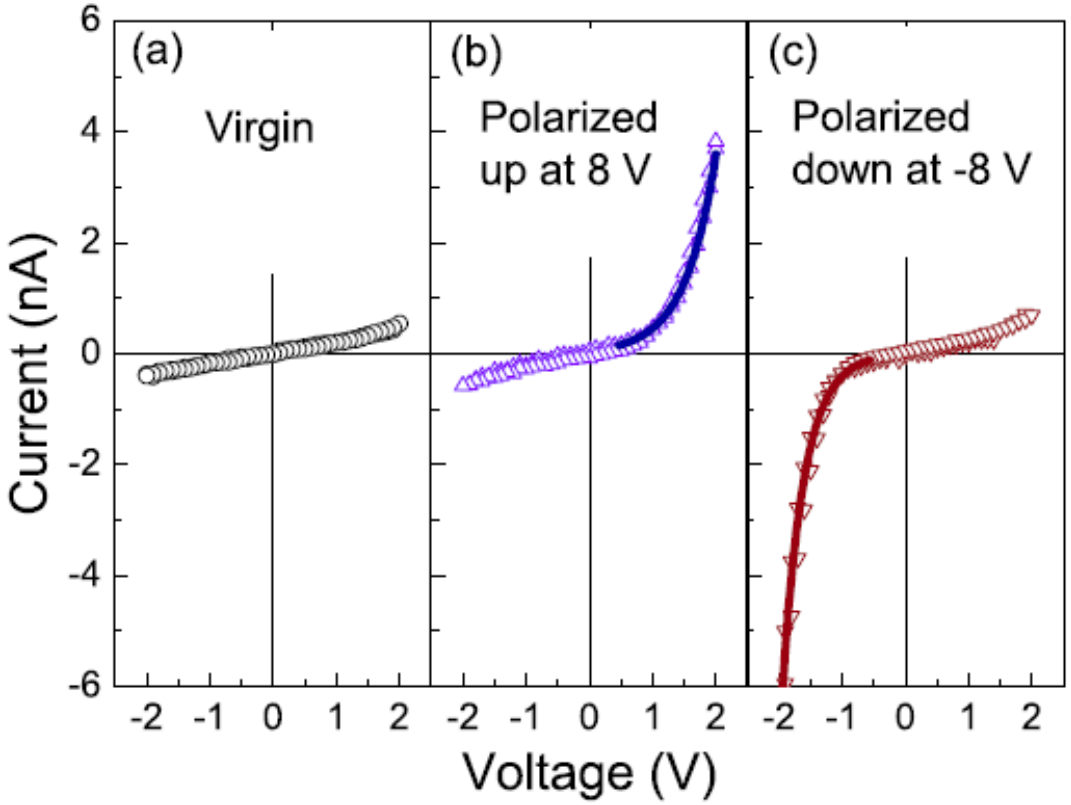


Switchable diode due to polarization reverse



Experimental result

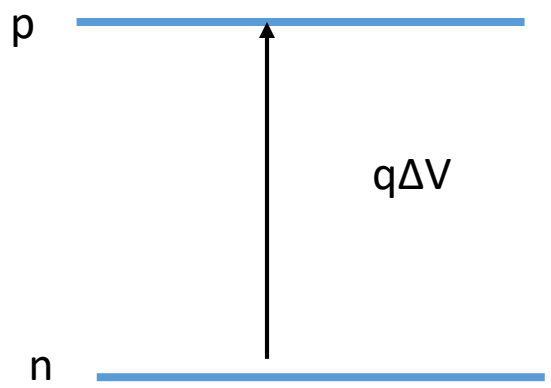




Can Wang, etc.,
APL 98, 192901 (2011)

Diffusion current in pn junction

- $j_D(x) = qN_D \frac{D}{L} e^{-\frac{x}{L}}$
- In pn junction with external field, $N_D = N' - N_0$
- $N' = n_i e^{-\frac{q(V-V_D)}{k_B T}}$, with external E
- $N' = n_i e^{-\frac{qV_D}{k_B T}}$, without external E
- So $j_D(x) = q \frac{D}{L} N' (e^{\frac{qV}{k_B T}} - 1)$



Electron excitation