

Advance in modulation engineering of ferroelectrics and multiferroics with non-chemical agents and factors: a review

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Table 1 The summary of engineering effects for the ferroelectrics and multiferroics.

Ferroelectrics/ Multiferroics	Modulating strategies	Effects	Ref.
CuInP_2S_6	pressure	increasing polarization below 0.26 GPa	92
$\text{Hg}_3\text{Te}_2\text{Cl}_2$	pressure	phase transition	95
$\text{Lu}_{0.5}\text{Sc}_{0.5}\text{FeO}_3$	pressure	enhancing polarization and T_N	111
$\text{Bi}_5\text{Ti}_3\text{FeO}_{15}$	force	switching ferroelectric and magnetic domains	114
$[(\text{CH}_3)_2\text{NH}_2]\text{Co}(\text{HCOO})_3$	pressure	phase transition	119
$[(\text{CH}_3)_2\text{NH}_2]\text{Mn}(\text{HCOO})_3$	pressure	phase transition	120
$0.66\text{Bi}_{0.90}\text{Dy}_{0.10}\text{FeO}_3$ - 0.34PbTiO_3 (34PTDy10)	stress	magnetolectric coupling	128
$\text{Ni}_{0.5}\text{Fe}_2\text{O}_4/\text{BaTiO}_3$	stress	magnetolectric coupling	129
PbTiO_3	negative pressure	increasing spontaneous polarization	138
$(\text{EuTiO}_3)_{0.5}:(\text{MgO})_{0.5}$	negative pressure	magnetolectric coupling	43
$\text{Sn}_2\text{P}_2\text{S}_6$	light irradiation (wavelength 532 nm 0.71, 1.42, 7.1 W/cm^2)	enhancing domain wall conductivity	154
PbTiO_3	light irradiation (laser: wavelength from 365 nm to 905 nm)	eliminating polar bubble domains	155
BaTiO_3	light irradiation (laser wavelength 405 nm, 12.2 W/cm^2)	switching ferroelectric domains	44
$\text{BiFe}_{0.8}\text{Co}_{0.2}\text{O}_3$	light irradiation (laser wavelength 405 nm, 95 mW/cm^2)	magneto–electric–optical coupling	159
SA-PFA	light irradiation (wavelength: 365 nm, 488 nm)	structural transformation, switching ferroelectric domain	142
tBu-2-FSA	light irradiation (wavelength: 365 nm, 488 nm)	structural transformation, switching ferroelectric domain	163
$\text{CH}_3\text{NH}_3\text{PbI}_3$	light irradiation (wavelength: 450 nm, power: 0.5 mW)	switching ferroelectric domain	164
$\text{Ni}(\text{DPA})_2$	UV light irradiation (wavelength: 365 nm, 405 nm)	tuning polarization	165
Ni/BaTiO_3	visible light illumination (wavelength: 532 nm, power: 10 mW)	cooperative ferroelectric and ferromagnetic domain walls motion	172

(References corresponding to the main text.)

