

3. SYMMETRY ASPECTS OF PHASE TRANSITIONS, TWINNING AND DOMAIN STRUCTURES

$G(\mathbf{S}_1, \mathbf{S}_j)$	G -orbit of domain pairs	K_{ik}	twinning group of the domain pair $(\mathbf{S}_i, \mathbf{S}_k)$
$G(\mathbf{S}_1 \mathbf{n} \mathbf{S}_j)$	G -orbit of simple domain twins	K_{ik}^*	twinning group of a completely transposable domain pair $(\mathbf{S}_i, \mathbf{S}_k)$
\mathbf{n}	normal to a plane p	L_i	intermediate group, $F_i \subset L_i \subset G$
p, p'	equally deformed plane (EDP), plane of a domain wall, domain wall plane	\bar{J}_{ik}	sectional layer group of J_{ik}
$\mathbf{R}_1, \mathbf{R}_2, \dots, \mathbf{R}_i, \dots$	secondary ferroic single-domain states	\widehat{J}_{ik}	face group, floating subgroup of sectional group of J_{ik}
$\mathbf{R}_1^+, \mathbf{R}_1^-, \mathbf{R}_2^+, \mathbf{R}_2^-, \dots$	disoriented secondary ferroic domain states	r_{ik}^*	symmetry operation that exchanges \mathbf{S}_i and \mathbf{S}_k
$sd (0 \leq s < 1)$	location of a plane in crystal lattice	\underline{S}_{ik}	symmetry operation that inverts \mathbf{n} into $-\mathbf{n}$
$\mathbf{S}_1, \mathbf{S}_2, \dots, \mathbf{S}_i, \dots$	principal single-domain states (orientation states, variants)	L_{ik}^*	symmetry operation that exchanges \mathbf{S}_i and \mathbf{S}_k and inverts \mathbf{n} into $-\mathbf{n}$
$\mathbf{S}_1^+, \mathbf{S}_1^-, \mathbf{S}_2^+, \mathbf{S}_2^-, \dots$	disoriented domain states	$T_{ik}(\mathbf{n})$	symmetry group of the twin $T_{ik}(\mathbf{n})$
$\mathbf{S}_1, \mathbf{S}_2, \dots, \mathbf{S}_i, \dots$	basic (microscopic) single-domain states (structural variants)	$W_{ik}(\mathbf{n})$	symmetry group of the domain wall $W_{ik}(\mathbf{n})$
$(\mathbf{S}_i, \mathbf{S}_k)$	ordered domain pair = ordered pair of domain states \mathbf{S}_i and \mathbf{S}_k	\mathcal{T}_i	translational subgroup of \mathcal{F}_i
$\{\mathbf{S}_i, \mathbf{S}_k\}$	unordered domain pair = unordered pair of domain states \mathbf{S}_i and \mathbf{S}_k	\mathcal{T}_{ik}	translational subgroup of \mathcal{F}_{ik}
$(\mathbf{S}_i \mathbf{n} \mathbf{S}_k)$	simple domain twin formed from single-domain states		
$(\mathbf{S}_i^+ \mathbf{n} \mathbf{S}_k^-)$	simple ferroelastic domain twin with a compatible domain wall		
$[\mathbf{S}_i \mathbf{n} \mathbf{S}_k]$	domain wall in the simple twin $(\mathbf{S}_i \mathbf{n} \mathbf{S}_k)$		
$T_{ik}(\mathbf{n})$ or \mathbf{T}_{ik}	simple domain twin – short symbol		
$W_{ik}(\mathbf{n})$ or \mathbf{W}_{ik}	domain wall – short symbol		
ω	shear angle, obliquity		
$\pm \frac{1}{2}\omega$	disorientation angle of a domain state		

(b) Symmetry groups – point groups in a continuum description and space groups in a microscopic description

F	point-group symmetry of the ferroic phase (domain state not specified)
\mathcal{F}	space-group symmetry of the ferroic phase (domain state not specified)
F_i	point-group symmetry of a principal domain state \mathbf{S}_i
\mathcal{F}_i	space-group symmetry of a basic (microscopic) domain state \mathbf{S}_i
F_{ik}	point-group symmetry (stabilizer in G) of the ordered domain pair $(\mathbf{S}_i, \mathbf{S}_k)$
\mathcal{F}_{ik}	space-group symmetry (stabilizer in \mathcal{G}) of the ordered domain pair $(\mathbf{S}_i, \mathbf{S}_k)$
\bar{F}_{ik}	sectional layer group of F_{ik}
\widehat{F}_{ik}	face group, trivial layer group, scanning group of F_{ik}
Fam G	crystal family of the group G
G	point-group symmetry of the parent phase
\mathcal{G}	space-group symmetry of the parent phase
g	point-group symmetry operation of the group $G(\mathcal{G})$
g	space-group symmetry operation of the group \mathcal{G}
g_{ik}	switching operation in domain pair $(\mathbf{S}_i, \mathbf{S}_k)$, transforms \mathbf{S}_i into \mathbf{S}_k
g_{ik}^*	transposing operation in domain pair $(\mathbf{S}_i, \mathbf{S}_k)$, exchanges \mathbf{S}_i and \mathbf{S}_k , twinning operation of a non-ferroelastic domain pair $(\mathbf{S}_i, \mathbf{S}_k)$
$I_G(\mathbf{S}_i)$	stabilizer (isotropy group) of \mathbf{S}_i in G
$\mathcal{I}_{\mathcal{G}}(\mathbf{S}_i)$	stabilizer (isotropy group) of \mathbf{S}_i in \mathcal{G}
J_{ik}	point-group symmetry (stabilizer in G) of the unordered domain pair $\{\mathbf{S}_i, \mathbf{S}_k\}$
J_{ik}^*	point-group symmetry (stabilizer in G) of a completely transposable domain pair $\{\mathbf{S}_i, \mathbf{S}_k\}$
\mathcal{J}_{ik}	space-group symmetry (stabilizer in \mathcal{G}) of the unordered domain pair $\{\mathbf{S}_i, \mathbf{S}_k\}$

(c) Components of property tensors

ρ	enantiomorphism
P_i	polarization
ϵ_{ij}	dielectric permittivity
u_μ	strain
σ_μ	mechanical stress
g_μ	optical activity
$d_{i\mu}$	piezoelectricity
$r_{i\mu}$	electro-optics
$A_{i\mu}$	electrogyration
$s_{\mu\nu}$	linear elasticity
$Q_{\mu\nu}$	electrostriction (contracted notation, see Section 1.1.4.10.5)
$\pi_{\mu\nu}$	piezo-optics (contracted notation, see Section 1.1.4.10.5)

$i = 1, 2, 3; \mu, \nu = 1, 2, \dots, 6.$

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3.4. DOMAIN STRUCTURES

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