

## 27 HCl family

### 27A Pure compounds

#### No. 27A-1 HCl, Hydrogen chloride

( $M = 36.46$ ; [D: 37.47])

1a	Ferroelectricity in HCl was discovered by Hoshino et al. in 1967.			67Hos
b	phase	II	I	
	state	F	P	<sup>a)</sup> 67San1
	crystal system	orthorhombic	cubic	<sup>b)</sup> 67San2
	space group	Bb2 <sub>1</sub> m–C <sub>2v</sub> <sup>12</sup> <sup>a)</sup>	Fm3m–O <sub>h</sub> <sup>5</sup> <sup>b)</sup>	<sup>c)</sup> 28Gia
	Θ[K]	98.36 <sup>c)</sup> [D: 105.03 <sup>d)</sup> ]		<sup>d)</sup> 47Clu
	<i>T</i> <sub>melt</sub> = 158.91 <sup>c)</sup> [D: 158.44 <sup>d)</sup> ] K.			
	Curie temperature in HCl–DCl system: Fig. 27A-1-001.			
2a	Crystal growth: cooling method from liquid phase.			67Hos
3a	Unit cell parameters: Table 27A-1-001.			
b	<i>Z</i> = 4 in phases I and II.			67San1
	Crystal structure: Table 27A-1-002, Table 27A-1-003; Fig. 27A-1-002.			
	Angular displacements due to molecular vibration: Fig. 27A-1-003.			
4	Thermal expansion of DCl in phase I: Fig. 27A-1-004; see also			75Pre
5a	Dielectric constant: Fig. 27A-1-005.			
	Dielectric dispersion: see			53Bro, 54Swe, 55Hav, 57Col, 67Gro
	Phase diagram with regard to <i>p</i> : Fig. 27A-1-006.			
c	Spontaneous polarization: Fig. 27A-1-007.			
6a	Heat capacity: Fig. 27A-1-008.			
	Transition heats and transition entropies of HCl and DCl: Table 27A-1-004.			
8a	Elastic stiffnesses of DCl obtained from phonon dispersion curves measured by neutron inelastic scattering: <i>c</i> <sub>11</sub> = 6.29(23) · 10 <sup>9</sup> N m <sup>–2</sup> , <i>c</i> <sub>12</sub> = 3.95(22) · 10 <sup>9</sup> N m <sup>–2</sup> , <i>c</i> <sub>44</sub> = 2.47(12) · 10 <sup>9</sup> N m <sup>–2</sup> , at 109 K (phase I).			75Pre
	Volume compressibility: β = 3.67 · 10 <sup>–10</sup> Pa <sup>–1</sup> at 130 K (phase I).			62Ste
9a	Far infrared absorption: Fig. 27A-1-009; see also			55Hor, 62And, 71Car
	Pressure effect: Fig. 27A-1-010.			
10a	Raman scattering: lattice mode frequencies: Table 27A-1-005; Fig. 27A-1-011; see also			93Mil
	Pressure effect of HCl: Fig. 27A-1-012;			
	pressure effect of DCl: see			90Joh

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13a	NMR	
	HCl: Fig. 27A-1-013, Fig. 27A-1-014;	
	DCl: Fig. 27A-1-015;	
	NQR	
	HCl: Fig. 27A-1-016;	
	DCl: Fig. 27A-1-017; see also	77Rag
	HCl–DCl system: Fig. 27A-1-018, Fig. 27A-1-019, Fig. 27A-1-020.	
c	Mössbauer effect of $^{57}\text{Fe}$ implanted in HCl: see	85Buk

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14b	Phonon dispersion: Fig. 27A-1-021.	
	Incoherent neutron scattering by proton motions in phase I: Fig. 27A-1-022.	
	Inelastic scattering of cold neutrons: see	65Bou

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