## Anhang

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### *Verzeichnis der verwendeten Abkürzungen*

| | | | |
|---|---|---|---|
| $A_0$ | Antiferroelektrisch orthorhombische Phase | EDX | Energiedispersive Röntgenfluoreszenzanalytik |
| $A_T$ | Antiferroelektrisch tetragonale Phase | $f_{min/max}$ | Impedanzminimum bzw. Impedanzmaximum |
| C | Kapazität | $F_{R(HT)}$ | Ferroelektrisch rhomboedrische Phase (Hochtemperatur) |
| D | Dielektrische Verschiebung | $F_{R(LT)}$ | Ferroelektrisch rhomboedrische Phase (Niedrigtemperatur) |
| DTA/TG | Differentialthermoanalyse/ Thermogravimetrie | $F_T$ | Ferroelektrische tetragonale Phase |
| $\varepsilon_{mj}$ | Dielektrizitätskonstante | ICP-AES | Atomemssionsspektroskopie mit induktiv gekoppelten Plasma |
| $d_{mj}$ | Piezoelektrischer Koeffizient | k | Elektromechanischer Kopplungsfaktor |
| E | Elektrische Feldstärke | | |
| $E_c$ | Koerzitivfeldstärke | | |

| | | | |
|---|---|---|---|
| $k_{eff}$ | Effektiver Kopplungsfaktor | $S_{max}$ | Maximale Dehnung |
| $k_p$ | Planare Kopplungsfaktor | $S^M$ | Mechanische Dehnung |
| $k_t$ | Dickenkopplungsfaktor | $S_R^M$ | Remanente mechanische Dehnung |
| LOI | Glühverlust (loss of ignition) | T | Temperatur |
| P | Polarisation | $T^M$ | Mechanische Spannung |
| $P_C$ | Paraelektrische kubische Phase | tan δ | Dielektrische Verlustwinkel |
| $P_{max}$ | Maximale Polarisation | $T_c$ | Curie-Temperatur |
| $P_r$ | Remanente Polarisation | TEM/ | Transmissionselektronen- |
| $P_s$ | Sättigungspolarisation | STEM | mikroskopie |
| $P_{spon.}$ | Spontane Polarisation | U | Elektrische Spannung |
| PT | Bleititanat | WDX | Wellenlängendispersive Röntgen- |
| PZ | Bleizirkonat | | fluorezenzspektroskopie |
| PZT | Bleizirkonat-Titanat | XRD | Röntgenpulverdiffraktometer |
| PZT/SKN | Bleizirkonat-Titanat substituiert | | |
| | mit Strontium-Kaliumniobat | | |
| q | Elektrostriktionskonstante | | |
| REM | Rasterelektronenmikroskopie | | |
| RFA | Röntgenfluoreszenzanalytik | | |
| S | Dehnung | | |

### *Identifizierung von Röntgenpulverdiffraktogrammen*

Die Identifizierung der kristallinen Phasen erfolgte anhand der Übereinstimmung mit den entsprechenden JCPDS-Karten.

JCPDS-Karte 05-0561 für PbO syn. (tetragonal); JCPDS-Karte 38-1477 für PbO (orthorhombisch); JCPDS-Karte 37-1484 für $ZrO_2$ (Baddeleyit syn.); JCPDS-Karte 42-1164 für $ZrO_2$ (tetragonal); JCPDS-Karte 21-1272 für $TiO_2$ (Anatas syn.); JCPDS-Karte 06-0452 für $PbTiO_3$ (Macedonit syn.); JCPDS-Karte 35-0739 für $PbZrO_3$; JCPDS-Karte 33-0784 für $Pb(Zr_{0,52}Ti_{0,48})O_3$; JCPDS-Karte 27-1402 für Silzium-Standard und JCPDS-Karte 17-0747 für pyrochlorartige Phasen $(Ca,Na)_2(Nb,Ti)_2O_6F$.