# Microstructures in Ferroelastic Systems inc. Surface Relaxation

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**Ekhard K H Salje**

***Department of Earth Sciences, University of Cambridge, Downing Street, Cambridge CB2 3EQ, UK***

Phase transitions in minerals often lead to the formation of characteristic microstructures. The most common type, namely ferroelastic and co−elastic phase transitions, are often dominated by twin patterns. Twin Patterns may consist of individual twins, needle domains, combs and tweed patterns with a large variety of bending and, wiggle patterns of twin walls. In this review several characteristic features of mesoscopic twin patterns are described:

- twin walls can be fast diffusion pathways for impurities, the sites of exchange reactions etc.;
- the lattice distortion extends from the centre of the twin walls over several lattice units, the characteristic length W diverges at the transition point of a second order phase transition;
- typical wall energies are several millijoule per square meter;
- the bending of twin walls can relate to the formation of needle domains with characteristic trajectories of the curved walls;
- twin walls in order/disorder transitions occur via local fluctuations of the ordering patterns. This may lead to wiggly walls at early stages of the ordering process as predicted for pericline walls in alkali feldspars;
- the intersection of twin walls with surfaces leads to modifications of the surface potential which is expected to influence absorption and diffusion processes.