

APPLICATION SHEET

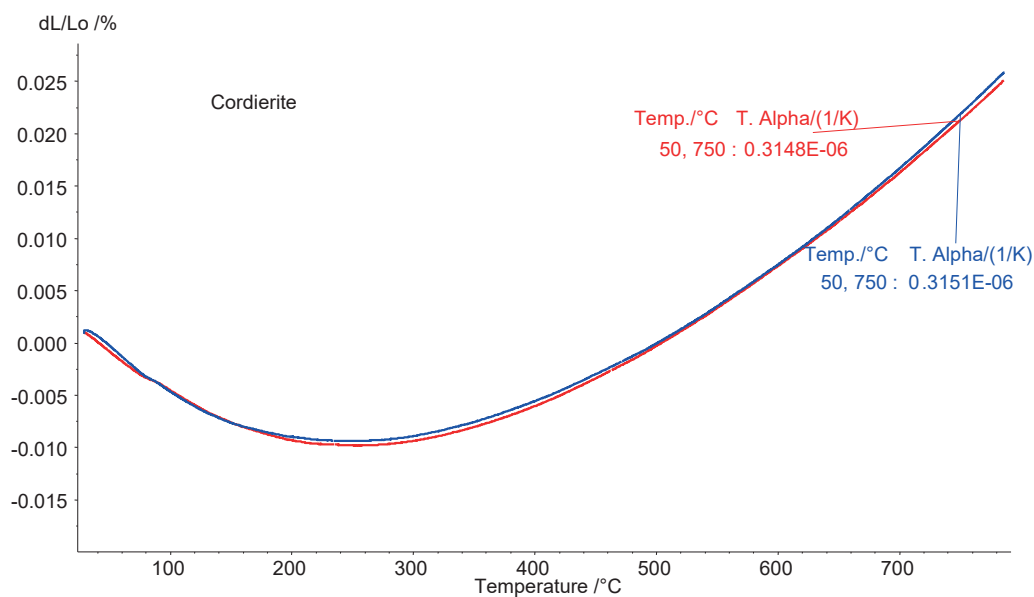
Ceramics · Automotive
DIL 402 CD

Cordierite

Introduction

The thermal expansion of two cordierite samples was measured using a NETZSCH model pushrod double dilatometer 402 CD. Cordierite is a magnesium iron aluminium cyclo-silicate. Iron is almost always present and a solid solution exists between Mg-rich cordierite and Fe-rich sekaninaite

with a series formula: $(\text{Mg,Fe})_2\text{Al}_4\text{Si}_5\text{O}_{18}$ to $(\text{Fe,Mg})_2\text{Al}_4\text{Si}_5\text{O}_{18}$. A high-temperature polymorph exists, indialite, which is isostructural with beryl and has a random distribution of Al in the $(\text{AlSi})_6\text{O}_{18}$ rings. One of the key features of cordierite ceramics is a low coefficient of thermal expansion. This is one of the reasons why cordierite ceramic is commonly used in catalytic converters in the automotive industry.



Test Conditions

Temperature range: RT ... 800°C
Heating rates: 10 K/min
Atmosphere: Air
Sample length: 25.9 mm
Sample holder: Fused silica

Test Results

The thermal expansion of two cordierite samples was simultaneously measured with the DIL 402 CD. The two curves are nearly identical representing the very good uniformity of the material. Typical for cordierite ceramics, the material shows a shrinkage up to 250°C. Then, the material expands. The CTE between 50°C and 750°C was approx. $0.315 \cdot 10^{-6}$ 1/K.