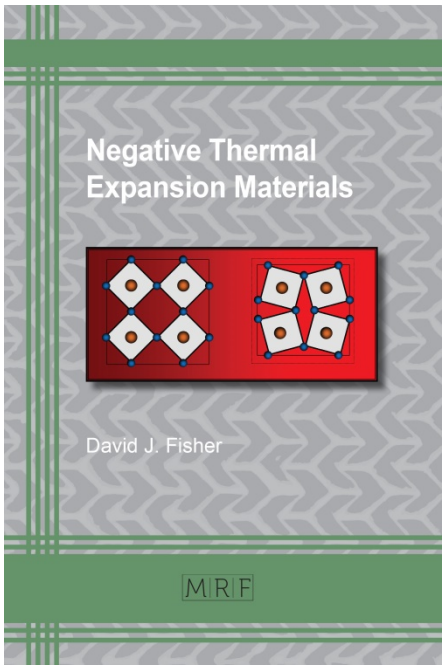
New Book Information

Materials Research
Solid State Physics and Engineering

Negative Thermal Expansion Materials



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The development of these negative thermal expansion materials has advanced rapidly during the past fifteen years, and a wide variety of materials of differing types has now been identified, as well as a number of intriguing mechanisms which help to avoid the apparent inviolable tendency of size to increase with temperature. The present work is the most up-to-date summary of the current range of negative thermal expansion materials and of the associated mechanisms.

Keyword: Negative Thermal Expansion Materials, Thermomiotic Behavior, Thermal Stress-Fracture, Thermal Expansion of Composites, Thin-Film Design, Metamaterials

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Summary:

In everyday life, minute thermally-induced elongations are essentially invisible to the naked eye; but even minute expansions can fatally degrade device processing and performance in – for example – the semiconductor industry. Materials which, astonishingly, contract upon heating offer the great advantage of being able to tune the overall thermal expansion of composite materials or to act as thermal-expansion compensators. The development of these negative thermal expansion materials has advanced rapidly during the past fifteen years, and a wide variety of materials of differing types has now been identified, as well as a number of intriguing mechanisms which help to avoid the apparent inviolable tendency of size to increase with temperature. The present work is the most up-to-date summary of the current range of negative thermal expansion materials and of the associated mechanisms.

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