



Thermometry at the Nanoscale: Techniques and Selected Applications (Nanoscience & Nanotechnology Series)

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Recent advances in technologies have created a need for sensing and measuring temperature at the nanoscale. This challenge requires new approaches and new techniques, since conventional thermometry is not valid at this scale. Thermometry at the Nanoscale covers the fundamentals of the subject, followed by individual chapters on luminescence-based and non-luminescence based thermometry techniques, and finally specific chapters on different applications of nanothermometry. The fundamental topics covered include a review of temperature measurement, the meaning of temperature on the nanoscale and heat propagation at the nanoscale. Luminescence-based techniques covered include quantum dots thermometry; lanthanide phosphors thermometry; organic dyes thermometry; polymer-based thermometry and organic-inorganic hybrids thermometry. Non-luminescence based thermometry techniques include scanning thermal microscopy; near-field thermometry and nanotubes thermometry. The range of applications of nanothermometry discussed includes thermometry inside a cell; microelectronics and micro/nanofluidics. This is the first book to cover the whole subject of thermometry at the nanoscale with specialists in each particular technique discussing in detail the recent achievements and limitations as well as future trends and technological possibilities. The book will appeal to researchers from materials science, physical chemistry, analytical chemistry and biological sciences working on the development of new materials, materials characterisation/analysis and their applications.

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Thermometry at the Nanoscale: Techniques and Selected Applications (Nanoscience & Nanotechnology Series) From Royal Society of Chemistry Bibliography

- Sales Rank: #5097322 in Books
- Published on: 2015-10-05
- Original language: English
- Number of items: 1
- Dimensions: 9.30" h x 1.40" w x 6.30" l, 2.15 pounds
- Binding: Hardcover
- 539 pages

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