Thermal Imaging at micrometer resolution

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Technology description

Thermal imaging (visual reproduction of thermal gradients within a body) is a mature science. Several instruments exist that are variants of infra-red (IR) radiation detection cameras. But with IR wavelengths starting off (~ 1 micron) where sizes of most biological microsystems (cells) end, current technology as above completely fails in applications requiring thermal imaging of the interiors of such systems. This invention employs hot luminescence (an anti-Stokes excitation phenomenon) and combines it with prevalent raster laser scanning techniques and confocal microscopy to come up with a method, required instrumentation and software to create thermal images at micrometer levels. By choosing dyes and excitation wavelengths appropriately, a wide spectrum of microsystems and temperature ranges can be accurately imaged. Analyses of thermal gradients yield substantive information about underlying phenomena in thermal imaging systems that exist or operate at micrometer or lower dimensions, such as biological cells, microchips, polymer processing, etcetera. The data generated through thermal imaging feeds a multitude of secondary and tertiary markets in medicine, drug and protein delivery, electronics, polymer science, etc.

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