Thermometry at the Nanoscale: Light in Action

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The emergence of luminescent nanothermometry during the last decade opened up the possibility of measure thermal flows at spatial scales below 1 μm, unreachable by conventional electrical methods [1]. In fact, diverse phosphors capable of providing a contactless thermal reading through their light emission properties have been examined, e.g., polymers, DNA or protein conjugated systems, organic dyes, quantum dots, and trivalent lanthanide ions incorporated in organic-inorganic hybrids, multifunctional heater-thermometer nanoplatforms, upconverting, downconverting and downshifting nanoparticles.

In the last couple of years, the focus of luminescence thermometry has gradually shifted from the fabrication of more sensitive nanoarchitectures towards the use of the technique as a tool for thermal bioimaging and for the unveiling of properties of the thermometers themselves and of their local surroundings [2-5].

After a general historical perspective of the work done on ratiometric luminescent nanothermometers since the explosion of the field at one decade ago, the lecture will be focused on recent examples illustrating the potential of the technology.

References

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