

Review Paper on Luminescence Thermometry

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Abstract: The Temperature measurements of turbo shaft nozzle guide vane demonstrated on a pair of moving turbine blades mounted in the engine at rotational speeds between 25,000 and 30,000 RPM. The method involves measuring the times of laser-induced luminescence thermo graphic thermal paint are applied on the turbine blades. The effects of motion on the temperature determination are removed by using a ratio of luminescence intensities. The data exhibit the measured temperatures are within the expected range for this engine. There are new one concept on measuring temperature is on heating side. The phenomenon of luminescence they can be classified into various types of categories depending on the mode of "excitation". Luminescence is (cold light) light from other sources of energy, which can take place at normal and the lower temperatures. In this new technology they can use to my field (mechanical engg)..

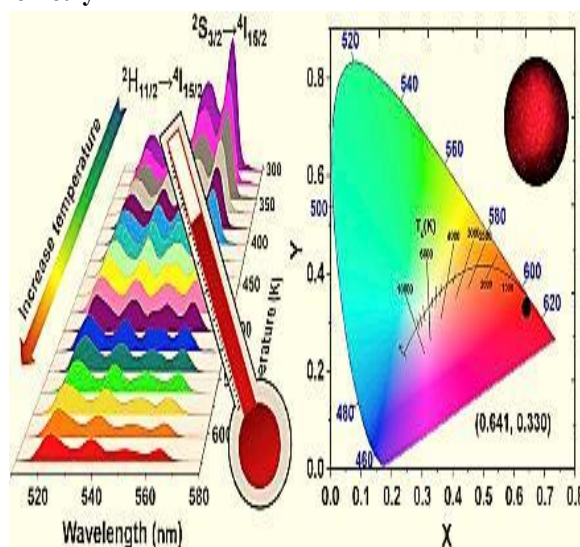
Keywords: Luminescence, Thermometry, Temperature measurement

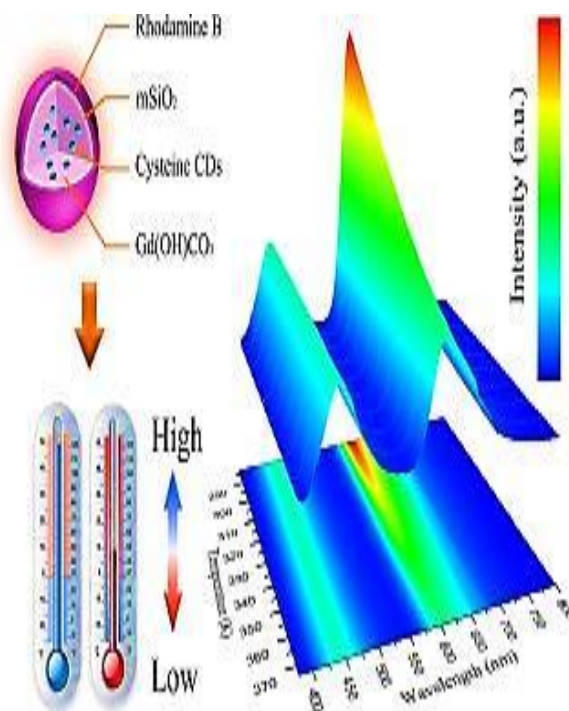
I. INTRODUCTION

Luminescence thermometry a mature and not so far old technology. The technique has been known, having been introduced as the 1940. A recent search for patents using the terms luminescence thermometry retrieved over 3000 results. Temperature measurement devices are abounding again, a simple web search for commercial products using the term temperature sensor gives almost 100 different possibilities in their review article on thermal sensors why then should we invest resources and effort into advancing luminescence thermometry.

The scientific background of luminescence thermometry is well-established as they are mainly derived from existing extensive form the fields of luminescence and materials sciences. It is known that different applications require different approaches in luminescence thermometry. There are many ways to determine the temperature from luminescence, depending on the applications. They are Likewise; many different materials can be used to construct a luminescence thermometry.

Image on Luminescence Thermometry-





Using on Luminescence Thermometer

Luminescent materials are applied on Major applications are in emissive displays as well as fluorescent lamps and LEDs light and systems to detect X-rays and Y-rays - for example, used in medical imaging. In there are latter kind of applications, luminescent materials are excited by photo with high energy.

In the first part, possibilities to influence the emission wavelength of rare-earth based phosphors will be discussed. The second part deals with applications of the rare-earth based luminescent materials. This contribution ends with a discussion of new one development in the field of rare-earth is "phosphors".

Luminescence Material

Luminescent materials with the aggregation-induced-emission (AIE). Luminescent materials also known as the phosphors. Luminescent materials are able to emit light, without heating effects (response to a stimulus); the design of luminescence processes through interband and intermolecular transitions typically requires substantial modification of material compositions. Luminescence processes have been termed as photon up-conversion that can be finds important biological and photonic applications such as short-wavelength lasing.

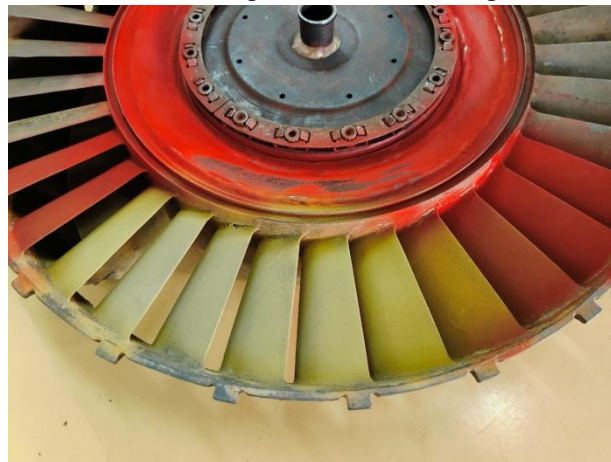
Experiment on Luminescence Thermometry-

First thermal paint is applied on nozzle blade. Then high flame can be throw on nozzle blade, flame temperature are 750 to 900c. then next stop the flam and then coldnozzles blade 10 to 15 minutes.

Then nozzles blade colour are change after complete heating and cooling process, seen the result on your own eyes they can see nozzle blade colour are change like blue, red, light green etc. After all the final result can find using luminescence thermometry.



Apply thermal paint to measurement temperature with the help of luminescence thermometry.



Part of gas turbine (Turbo shaft nozzle guide vane)

Application of Luminescence Thermometry-

1. Intracellular and intercellular temperature can be measurements.
2. In-tumor temperature monitoring during thermal thermal process.
3. Diagnosis can of ischemia using thermal imaging.

II. CONCLUSION

Luminescence thermometry is the quickly emerging application they can sector for sensitive temperature sensing. There are main conclusions can be the developed theoretical framework and the shown to result in design rules for, optimized performance of single ion luminescence thermometers.

REFERENCES

- [1]. Marcus Alden | Thermo graphic phosphors for thermometry: A survey of combustion applications | 28 September 2010.
- [2]. Monica Sharma | Nano thermometry: From Microscopy to Thermal Treatments | 07 October 2015.
- [3]. S.A.Wade | Fluorescence intensity ratio technique for optical fibre point temperature sensing | 2003.
- [4]. Jan Brubach | thermo graphic phosphors: A review | 3 November 2012.
- [5]. L.Marciniak | Luminescence thermometry with transition metal ions. A review | 21 June 2022.
- [6]. A.Bednarkiewicz | Luminescence based temperature bio-imaging: Status, challenges, and perspectives | 2021.
- [7]. Jiajia Zhou | Advances and challenges for fluorescence Nano thermometry | 28 September 2020.
- [8]. Daniel jaque | Luminescent Nano probes for thermal bio-sensing: Towards controlled photo-thermal therapies | 27 November 2015.
- [9]. Zoran Ristic | Triple-temperature readout in luminescence thermometry with Cr³⁺-doped Mg₂SiO₄ operating from cryogenic to physiologically relevant temperatures | 12 March 2021.
- [10]. K.Kinec | the influence of grain size and vanadium concentration on the spectroscopic properties of YAG: V³⁺, V⁵⁺ and YAG: V, Ln³⁺ (Ln³⁺ = Eu³⁺, Dy³⁺, Nd³⁺) Nano crystalline luminescent thermometers | 20 March 2018.
- [11]. Karolina Trejgis | Highly sensitive multipara metric luminescent thermometer for biologically-relevant temperatures based on Mn⁴⁺, Ln³⁺ co-doped SrTiO₃ Nano crystals | 28 April 2021.
- [12]. Daqin Chen | Dual-phase Nano-glass-ceramics for optical thermometry | 8 December 2015.
- [13]. Chua long wang | A spatial/temporal dual-mode optical thermometry platform based on synergetic luminescence of Ti⁴⁺-Eu³⁺ embedded flexible 3D micro-rod arrays: High-sensitive Tempe., secure anti-counterfeiting | 7 June 2019.