

# Ru(II)-based supramolecular frameworks as potential platforms for non-linear optical thermometry

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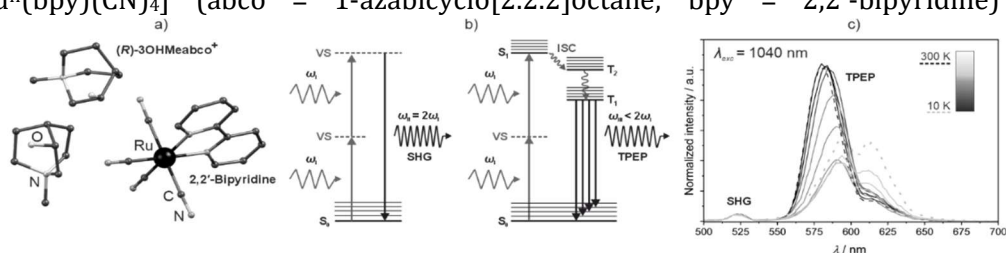
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Sensors play a vital role in contemporary technology by converting physical quantities such as temperature, pressure or light into digital signals suitable for computational analysis and interpretation. For example, photoluminescence-based techniques constitute an important class of such sensing methods [1], positioning luminescent thermometry as an effective non-contact approach for temperature determination [2]. Moreover, progress in the study of non-centrosymmetric materials enabled the integration of nonlinear optical phenomena (NLO) into the field of optical temperature sensing [3]. Taking the above into consideration, selected Ru(II) complexes (Figure a) were chosen as starting molecular building blocks due to their well-documented temperature sensitivity and intense MLCT emission, alongside the potential for observing the two-photon absorption (TPA) effect (Figure b) [4]. Their additional functionalization and the inducement of crystallization in noncentrosymmetric space groups, crucial for observing the second-harmonic generation (SHG) effect, can potentially enable simultaneous observation of two optical signals under a selected excitation source, each exhibiting distinct temperature sensitivity (Figure c). Herein, we present the above-mentioned approach on the example of a single-phase crystalline material, namely ((R)-3OHMeabco)<sub>2</sub>[Ru<sup>II</sup>(bpy)(CN)<sub>4</sub>] (abco = 1-azabicyclo[2.2.2]octane; bpy = 2,2'-bipyridine) highlighting

the potential of coexistence of NLO effects in ratiometric optical sensing.



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