Luminescence properties of $Rb_2SnCl_6:Te^{4+}$ at high pressures

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Prior research by S. Si et al. [1] has proven the efficacy of these materials as laser-active media for high-power lasers, attributable to their 70% PLQY. In this study, we investigated the luminescence properties of $Rb_2SnCl_6:Te^{4+}$ under varying conditions. We conducted a comprehensive analysis of the PL emission over a range of pressures and temperatures. The objective was to determine if the luminescence intensity of $Rb_2SnCl_6:Te^{4+}$ could be enhanced under these conditions. Figure 1a illustrates the PL spectra measured at 10 K across pressures from 0.09 to 4.64 GPa. We observed a consistent blue shift in the emission wavelength as pressure increased. Initially, there was a quenching of luminescence up to 2 GPa, beyond which the intensity of the emission began to rise with increasing pressure. In contrast, the temperature-dependent PL spectra (Figure 1b) were measured from 4.5 to 300 K with an excitation wavelength of 385 nm. The maximum intensity was observed at 20 K with a peak emission at 575 nm. As the temperature increased, the emission intensity decreased, with the peak shifting to 580 nm at 300 K. These findings indicate that pressure can influence the luminescence properties of $Rb_2SnCl_6:Te^{4+}$, potentially enhancing its intensity under specific conditions.

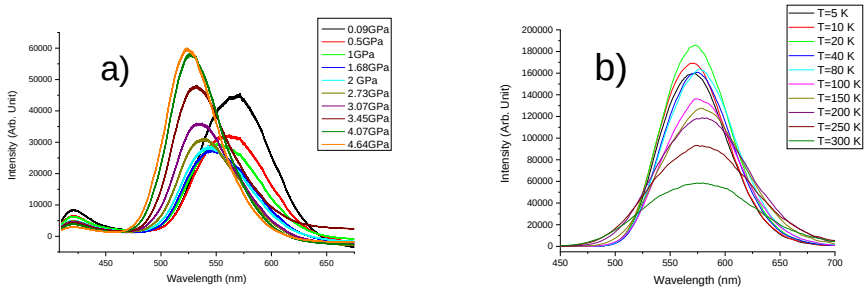

Figure 1. Photoluminescence spectra under pressure (a) and temperature (b).

Acknowledgments: This work was partially supported by the Polish National Science Center program SHENG2 of Poland-China cooperation, project number: 2021/40/Q/ST5/00336.

[1] S. Si et al., (2022), Journal of Luminescence, 251, 119212.

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