Time-domain transient fluorescence spectroscopy for thermal characterization of polymers

Objective

Characterize, determine thermophysical properties (such as thermal diffusivity and conductivity) of polymers (PVC) using fluorescence spectroscopy.

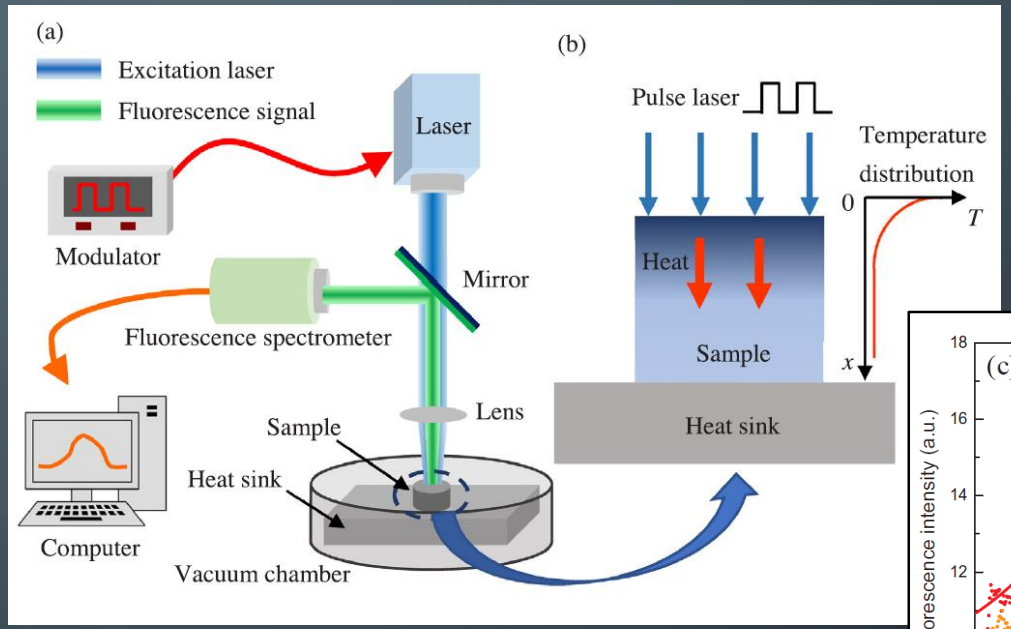
Sample preparation

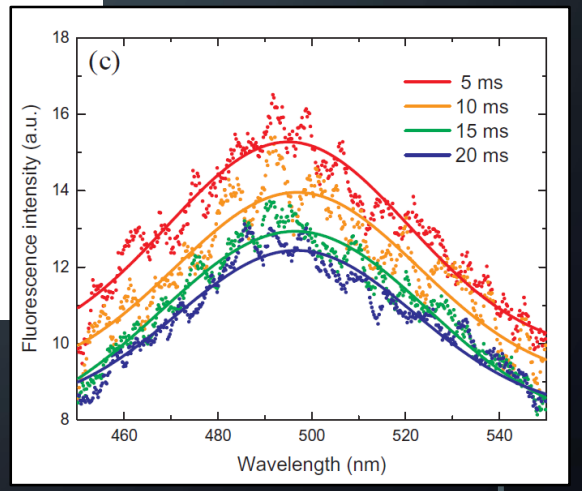
The PVC is placed in a vacuum chamber and its bottom attached on a copper heat sink.

Data acquisition conditions

"A continuous semiconductor laser (150 mW) with 405 nm wavelength is modulated with adjustable pulse duration. Only one laser in the measurement is employed as the heating and fluorescence excitation source. Excitation spectra are collected by a fluorescence spectrometer (HR2000+, Ocean Optics). Pulse frequency 10 Hz, heating time (te=duty time/frequency) 1-20 ms per cycle with adjustable duty ratio [te/(te+tr)] 1% -20%."

Representative figure /results





Reference

Wu, H. Cai, K. Zeng, H. Zhao, W. Xie, D. Yue, Y. Xiong, Y. Zhang, X. Time-domain transient fluorescence spectroscopy for thermal characterization of polymers, Applied Thermal Engineering, Volume 138, 2018, Pages 403-408, ISSN 1359-4311, https://doi.org/10.1016/j.applthermaleng.2018.04.076. (http://www.sciencedirect.com/science/article/pii/S1359431117349086)