HIGH-THROUGHPUT MICROPLASTIC MONITORING IN MICROFLUIDICS BY RAPID COHERENT RAMAN SCATTERING SPECTROSCOPY

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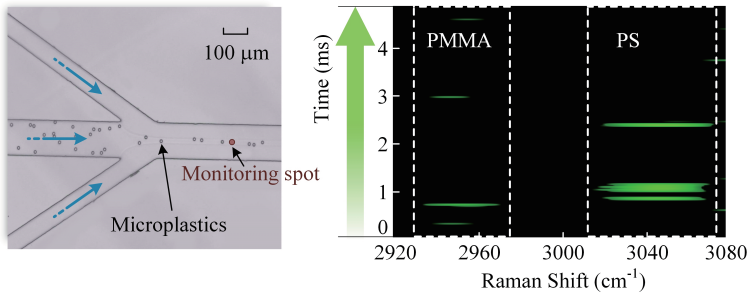

Although small microplastics pose a huge threat to aquatic environment and biological health, current microplastic monitoring procedures are rather time-consuming and laborious. With the help of the rapid coherent anti-Stokes Raman scattering microspectroscopy as a label-free molecular identification approach, we achieved microplastic monitoring in microfluidics with a high throughput of ˜2150 events/s. The spectral refresh rate, i.e. the theoretical highest throughput, is 35 000 events/s by the apparatus, which is the highest speed for flow device monitoring up to the present. Also, we classified PS and PMMA microbeads based on their unique spectral peaks, and the classification was further verified by principal component analysis (PCA). Other sets of results under different flow velocities are further classified and verified by the PCA model trained by the first set of data, with a consistency more than 99%, which demonstrates the repeatability and consistency of our system in rapid monitoring.