

Spectrometer Application Report

Brillouin Spectroscopy of a Plastic Film

March 20, 2020

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A small piece of plastic wrap (common food wrap) was suspended above a 20X microscope objective. The thickness of the plastic film is $7.2 \pm 0.2 \mu\text{m}$, as measured with a Heidenhain apparatus. This corresponds to $\sim 30\%$ of the excitation/collection focal volume depth of the objective, which is $\sim 25 \mu\text{m}$ along the z-axis.

The Brillouin spectrum of the plastic film is presented in Figure 1. The pump laser signal is absent from the spectrum since it was successfully suppressed by the two “Pump Killers” included in the systems. The measured Brillouin frequency shift of the plastic film is $14.39 \pm 0.02 \text{ GHz}$.

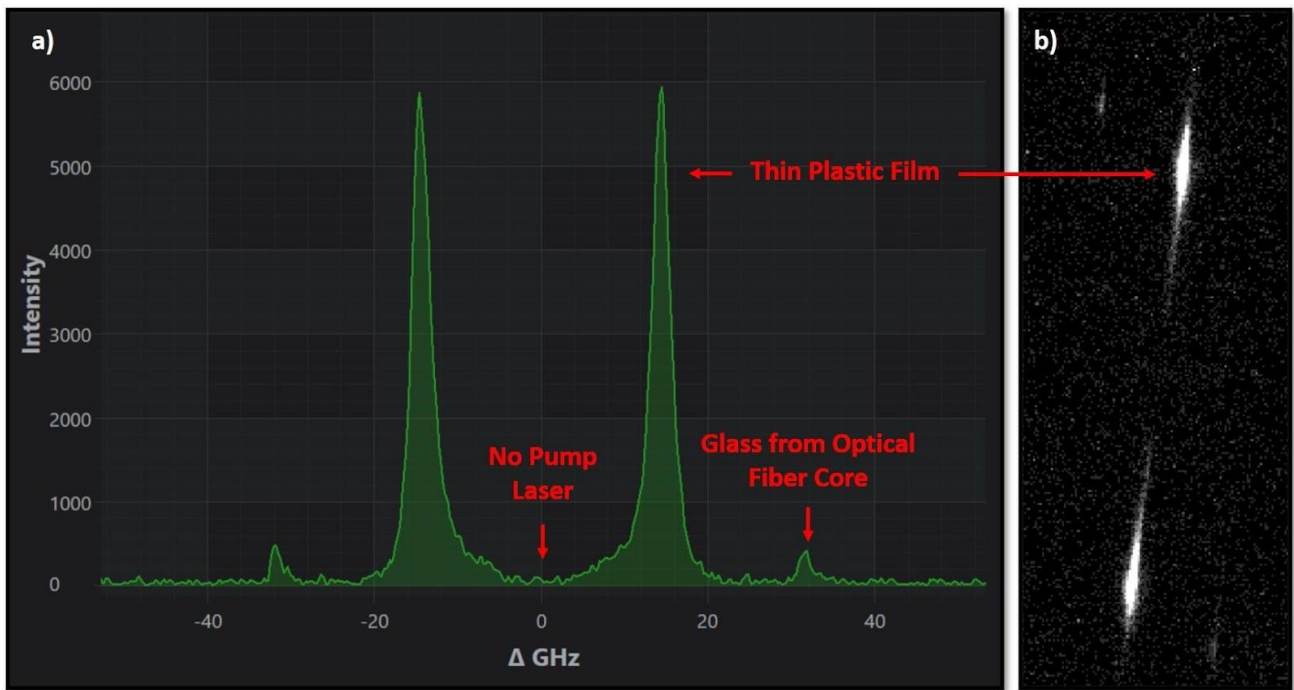


Figure 1: a) Brillouin frequency shift spectrum of a suspended plastic film. b) Raw sensor image. The time exposure was set to 5 seconds and the number of averages to 5.

Specifications

Sample	System
<ul style="list-style-type: none"> • Material: Plastic wrap to preserve food “Glad Cling Wrap” • Thickness: $7.2 \pm 0.2 \mu\text{m}$ 	<ul style="list-style-type: none"> • Pump wavelength: 532 nm • Power at sample: 25 mW • FWHM of the instrument response: nominal 0.9 GHz • Repeatability of Brillouin shift: highly sample and exposure dependent; $< 10 \text{ MHz}$ is possible