

**Q. We want to conduct time course measurement with FTIR. How about the level of its time resolution?**

**A. FTIR has 3 methods of time course measurement: interval measurement, rapid-scan, and step-scan measurement. Time resolution is 1 sec, 50 msec, 5  $\mu$ sec (optional: 10 nsec) respectively.**

We will show each method's feature and measurement case here. Each method has a different type of scanning method of a moving mirror inside an interferometer. "Interval measurement" is performed with regular scanning and "rapid-scan measurement" is with rapid scanning on time course measurement. On "step-scan measurement," a moving mirror makes a stop at every data-sampling point and perturbation is given at the points.

<b>Interval Measurement*1</b>	<b>Time Res.:</b> 1 sec ~	<b>Application case:</b> structural transition of a sample, monitoring of gas concentration
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**Measurement Ex.:** Measured a transition of CO<sub>2</sub> concentration in room air. (Fig. 1) Interval measurement is effective for long-time monitoring of gas analysis. \*1 JASCO interval measurement program conducts maximum measurement of 60001 data or 24 days.

<b>Rapid-scan measurement</b>	<b>Time Res.:</b> 50 msec ~	<b>Application case:</b> photo-polymerization reaction, orientation relaxation of polymer film
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**Measurement Ex.:** The cure process of UV cured resin was measured, which represents photo-polymerization reaction. (Fig. 2) Take a look at the peak intensity transition at 1637 cm<sup>-1</sup> (bottom of Fig. 2), which attributes C=C stretching vibration. It shows the peak intensity rapidly decreased responding to UV irradiation and kept decreasing moderately and tells the initial reaction and reaction process on photo-polymerization was observed very accurately.

<b>Step-scan measurement*2</b>	<b>Time Res.:</b> 5 msec ~ *3	<b>Application case:</b> relaxation process of liquid crystal orientation
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**Measurement Ex.:** Relaxation process of liquid crystal orientation with electric field response was measured. (Fig. 3) Take a look at the peak intensity transition at 2925 cm<sup>-1</sup> (bottom of Fig. 3), which attributes C-H stretching vibration. It is observed that its peak intensity fluctuated responding to power voltage turning on and off, and also decreased in two steps, rapidly and then moderately, after power voltage was turned off. It is known that liquid crystal in the area near electrode has faster orientation relaxation than bulk and such difference between them was observed. \*2 limited to the materials with repetitive response. \*3 10 nsec ~ is optionally available.

