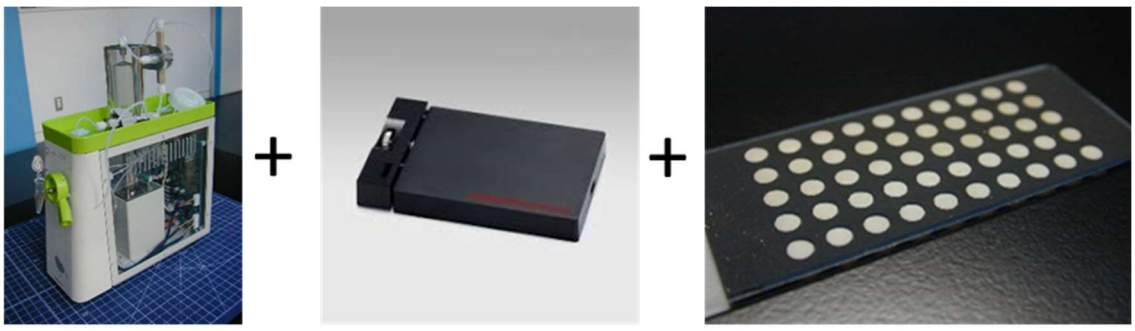
New Project: HPLC-SERS Jan 16, 2023

We think this is going to be another exciting year for SERS. Last year we embarked on a new project, combining HPLC and SERS. Although there are a number of reports on HPLC-SERS, we think we hit upon a wonderful combination.

Uniflows (Tokyo, Japan) has developed a portable HPLC, called e-HPLC Kotori. Kotori is Japanese for a small bird, fitting for the location of Uniflows often frequented by outdoor-oriented people. In any case, it comes in a small package, taking up the footprint of only 20 cm x 8 cm. It may not have the ultimate performance of much pricier machines, but it is quite capable. In particularly, it is wonderfully suited to be paired with a similarly compact Raman spectrometer C13560, from Hamamatsu Photonics (Hamamatsu, Japan). As a matter of fact, we like this device so much that we have purchased two of them. What do we do with them? Of course, we use the C13560 (along with a bigger machine) for our Nano=Kraft SERS substrates.
Now you are getting the idea. If we combine the e-HPLC Kotori, the C13560 Raman spectrometer and the Nano=Kraft SERS substrates, we get a pocked-sized (almost) HPLC-SERS system. Use of SERS for identification would allow us to relax the separation capability of the HPLC, making Kotori just perfect We are so excited with the prospect so we cannot help leaking this information here.



We have been collaborating with one of the pioneers of the flow type SERS, J. Ukon of UKON Craft Science Ltd. (Japanese Patent No. 6245664), formerly with Horiba Ltd. as a senior manager of R&D. We are sure that our collaboration leads to exciting results.

PLAN A

Here is our plan. In the first version, we collect fractions from Kotori and immerse the Nano=Kraft substrates into them, Simple enough. You might think that using so many SERS spots would make this prohibitively expensive, with typical SERS substates going for $50 or higher. Don't worry about that, because the Nano=Kraft substrate is not only capable, but significantly more affordable.

PLAN B

In the second version, we aim to obtain SERS spectra in real time as the sample flows. For this application, we are working on a capillary tube whose end is terminated with a porous membrane coated with noble metal nanoparticles. This may be more of a challenge because target molecules may simply pass through the nanoparticle layer reducing the signal intensity. Nonetheless, we think it is worthwhile trying.