



We have been toying with the idea of mounting a SERS substrate on a drone for some time. Just an idea because we were not sure what would be a good target. Normally, one imagines a drone operating high up in the sky where, to be honest, there might not be much to monitor. Without a specific target, we started playing with a new type of SERS substrates. We found just the right component; a circular metal part with a slight rectangular indentation in the middle where nanoparticles can be formed.

Moreover, it comes with an adhesive backing so that it can be attached to a solid flat surface quite easily, say the body of a drone or even on its rotor blade.

After we obtained a toy drone to mount the new SERS substrate, we started thinking more seriously about what our target should be. It



Super Light SERS



Our toy drone

has to be present at relatively high concentrations, maybe in a confined space. We also knew that sulfur compounds would make good targets because they bind readily to silver and tend to give strong signals. One possible candidate was H₂S which can exist in sewage that can harm and possibly kill those working in the vicinity.

Then, one day there was news about the collapse of a huge sewage tunnel in Saitama, just next to Tokyo. Sadly, a truck fell into it, turning it into a huge disaster. This came about because H₂S at high concentrations turned into sulfuric acid that can seriously weaken the concrete tunnel. The article also mentioned that the cost of monitoring the entire sewage network was simply not possible due to lack of money and manpower



A photo from the Asahi Shimbun

This is certainly a target worthwhile monitoring with a drone. As luck would have it, we came into contact with a company, [Liberaware Co. Ltd.](#), that developed a small drone to be operated in a confined space. We have been receiving much valuable advice from them. We hope we can give a joint announcement on our collaboration on the use of a drone-mounted SERS for monitoring H₂S in sewage tunnels. Please stay tuned for further news.