Microplastics loading estimation from urban areas to sewage treatment plants based from a monitoring campaign in Japan **OYutaka Kameda** (Chiba Institute of Technology, Japan) E-mail address: yutaka.kameda@it-chiba.ac.jp An example of MP analysis in raw wastewater

Abstract

We propose an analytical method for fine micoplastics (MP) by using µFTIR imaging, the Multivariate Curve Resolution (MCR) and the correlation analysis with their easy and quick sampling system.(WP067) By using this method, MP in influent and effluent at 20 sewage treatment plants (STPs) are analyzed to estimate their loads to STPs and rivers statistically as well as their time variation.



Various types of MP are released from houses and roads. They Fig. 1 enter to sewage treatment plants and finally rivers and sea.

Background

There are many countermeasures to reduce MP in oceans such as plastic charter at G7 meeting but we need enough knowledge about environmental behaviour of MP from their sources.







<u>24hrs survey</u>

Fig.3 STPs survey with a developed sampling system

STPs survey

We collected particles whose sizes are more than 10 µm by on site filtration of 1 m³ of effluent samples and 1L of influent samples (raw wastewater) at 20 STPs in Japan. We also collected influent samples once in an hour for 24 hours at one STP. In order to evaluate MP sources, HHCB, AHTN, caffeine and crotamiton are also measured.

MPs in both samples were extracted by H_2O_2 oxidation and NaI density separation (refer to WP056 poster).





Fig. Microscopic image of MP on a PTFE membrane filter





Fig. Thermo ScientificTM NicoletTM iN^{тм}10

extracted by MCR analysis.



Fig. Imaging for each MPs and other pollutants after Correlation analysis



Fig. FTIR observation image of MP on a PTFE membrane filter

By MCR analysis, major spectra including dominant MP spectra can be extracted. However, minor spectra could not be extracted. They can be found by correlation analysis by using our developed MP spectra profiles.

In this samples, about 1200 acryl particles (>10µm size) can be found in 1 L of wastewater samples. The concentration is much higher than expected. But some reports estimate fine MP will increase exponentially.

This system can evaluate polymer types, tire rubbers and other new potential pollutants! (e.g. silica derivatives in this case)