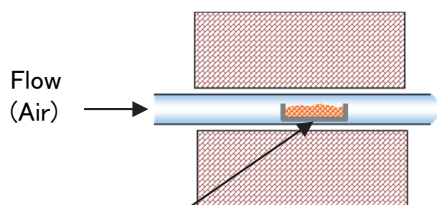


Analysis of decomposed gases of fluorine resins

It is difficult to study decomposed gases by heating of fluorine resins, because the gases might contain CO, CO₂, fluorocarbon, and highly corrosive gases (HF, COF₂). Here, we introduce an analysis example of the decomposed gas of fluorine resins using GC, GC-MS, IC and FT-IR.

Experimental set up



Heating fluorine resin until 350°C
(keep at 350°C for 15 min)



Gas sampling bag

⇒ GC-MS (+FT-IR) : Low volatile gas, CO, CO₂



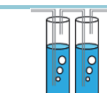
Trap tube

⇒ Thermal desorption GC-MS: Middle and high volatile gas



Solution trap

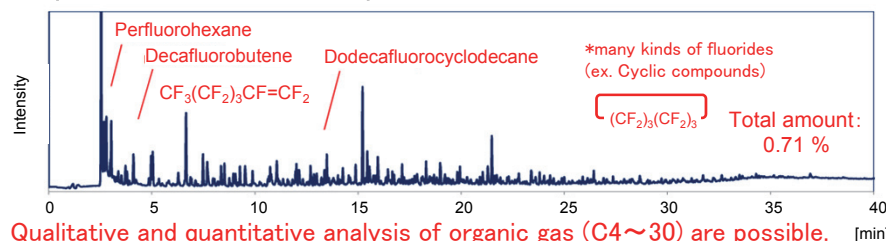
⇒ IC (Ion Chromatography) : F⁻



On-line measurement (FT-IR)

Organic component analysis by GC-MS

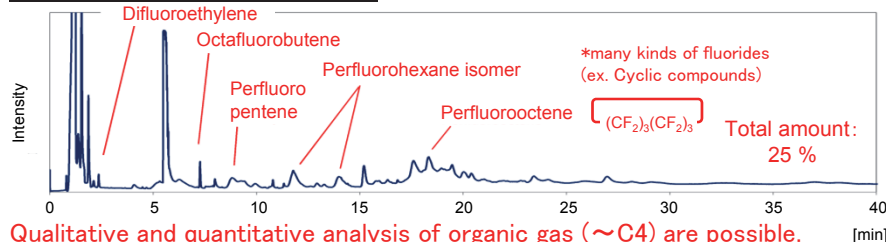
Trap tube + Thermal desorption GC-MS



Qualitative and quantitative analysis of organic gas (C₄~30) are possible.

Perfluorocarbons (C_xF_y) are detected.

Gas sampling bag + GC/MS

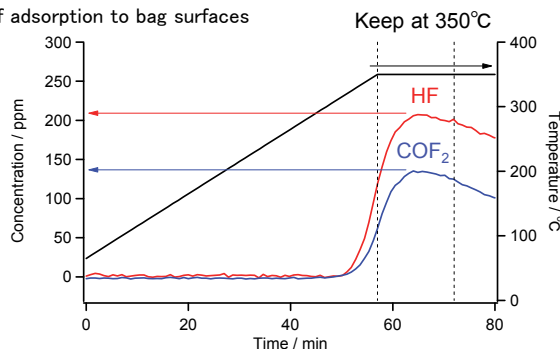
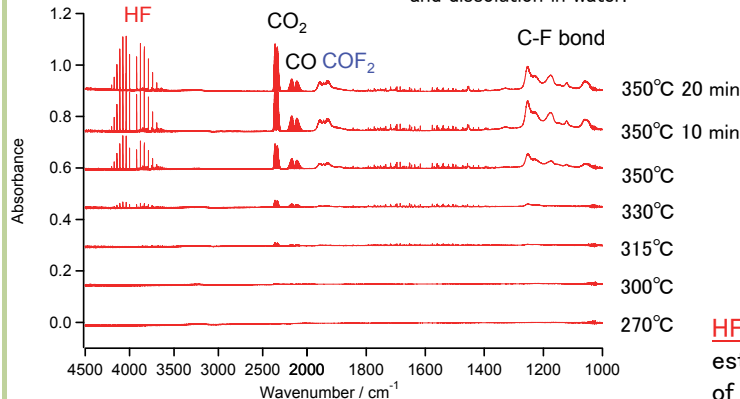


Qualitative and quantitative analysis of organic gas (~C₄) are possible.

Perfluorocarbons (C_xF_y) with low molecular weight are detected.

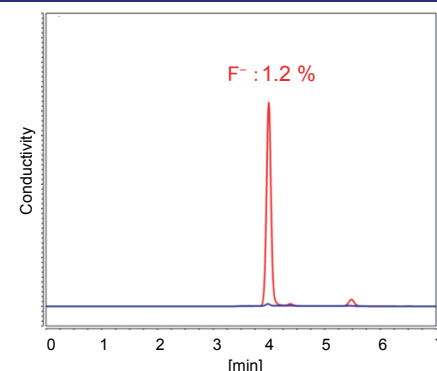
On-line analysis by FT-IR

※HF is not detected in the case of FT-IR after collecting gas in a sampling bag probably because of adsorption to bag surfaces and dissolution in water.



HF, COF₂ are detected separately, and the total amount can be estimated. This on-line analysis reveals that the decomposition of this fluorine resin begins at about 320°C.

F⁻ analysis by solution trap + IC



Quantitative analysis of F⁻ is possible.

However, it is difficult to identify the existence form in the gas. The obtained value is considered to contain the contributions of HF, COF₂, and SiF₄ due to a reaction with quartz tube.

Total amount for 15 min

HF : 0.71 % (0.67% as F⁻)

COF₂ : 1.4 % (0.85% as F⁻)