Ultrapure Water Application of ORGANO

# PURIC Water Information

## VOC（Volatile Organic Compounds） evaluation for ultrapure water by GC-MS

According to General rules for gas chromatography(JIS K 0144), it is written that the water used should not contain the measurement substances. In fact, considering of ghost peaks or analysis accuracy, even higher purity of water is required. In this material, we target at a one-hundredth of the standard concentration of the water supply law, which can be accepted as blank water, and analyze VOC (based on the water supply law) in Puric-α by GC-MS.

・Analytical equipment: Agilent7890B GC(5977A MSD,7697A HSS)
・Ultrapure water production equipment: PR-FP-0120α-UT0 set（ORGANO）
・Analytical conditions

| | |
|---|---|
| Column | :VF-624MS 30m x 250μm 1.4um |
| HSS | :Oven temp 60℃ , loop temp 60℃, Transfer line temp 120℃, Loop 3mL |
| GC | :Oven 40℃(1min) - 10℃/min - 140℃ - 20℃/min - 200℃ |
| | :Fill port S/SL Slip mode（Heater 200℃ , pressure 16.66psi , split ratio 50:1 , split flow rate 100mL/min, |
| | :column flow rate 2mL/min）, MSD transfer line （Heater 200℃） |
| MSD | : Measurement mode SIM , tuning etune |

Analysis result

| VOC | Concentration (ppb) | VOC | Concentration (ppb) | VOC | Concentration (ppb) |
|---|---|---|---|---|---|
| 1,1-Dichloroethylene | <0.02 | 1,2-Dichloroethane | <0.02 | Tetrachloroethylene | <0.02 |
| Dichloromethane | <0.02 | Trichloroethylene | <0.02 | Dibromochloromethane | <0.02 |
| trans-1,2-Dichloroethylene | <0.02 | 1,2-Dichloropropane | <0.02 | m,p-Xylene | <0.02 |
| cis-1,2-Dichloroethylene | <0.02 | Bromodichloromethane | <0.02 | o-Xylene | <0.02 |
| Chloroform | <0.02 | cis-1,3-Dichloropropene | <0.02 | Bromoform | <0.02 |
| 1,1,1-Trichloroethane | <0.02 | Toluene | <0.02 | 1,4-Dichlorobenzene | <0.02 |
| Carbon tetrachloride | <0.02 | trans-1,3-Dichloropropene | <0.02 | | |
| Benzene | <0.02 | 1,1,2-Trichloroethane | <0.02 | | |

Fluorobenzen,p-Bromofluorobenzene used as internal standards.


Summary

All measured VOC is below lower limits and verified as below a one –hundredth of the water supply law's standards. Commercial mineral water is often used as blank water for VOC measurement, but in mineral water, the hardness may vary and VOC are not controlled. To align analytical conditions and improve analytical accuracy, Puric-α is suitable, which can produce stably high purity of water.



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