

Quantitative Analysis of Dissolved Gases in Liquid

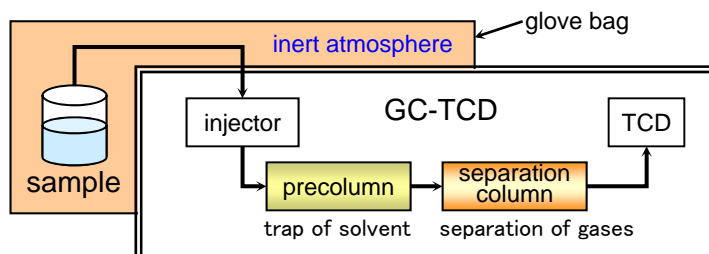
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Quantitative analysis of dissolved gases in liquid is a key process for quality control in manufacturing liquid products. Quick and appropriate separation of the liquid and the dissolved gases is necessary to obtain the accurate contents of the gases. The time dependence of the dissolved gas concentration and the temperature dependence of the solubility of gases can be determined by the specified GC.

Analytical procedure

1. Injection of the sample solution to GC.
2. Trap of solvent in the precolumn to make the only dissolved gas go to the separation column.
3. Separation of H₂, O₂, N₂, and etc. by separation column.
4. Detection by Thermal Conductivity Detector.

O₂ and N₂ should be sampled and injected to GC under inert atmosphere preventing air contamination



Objective gas : H₂, O₂, N₂, CO₂, CO, Hydrocarbon(C₁₋₂)
Sensitivity : N₂, O₂ ⇒ 1~10 µg/mL

Analysis of dissolved H₂, O₂, and N₂ in liquid material

Pure water, Toluene, and EC/DMC/DEC were exposed to the mixed gas of H₂, O₂, N₂ and Ar.
The dissolved gases were analyzed after 1, 5, 10, and 30 min.

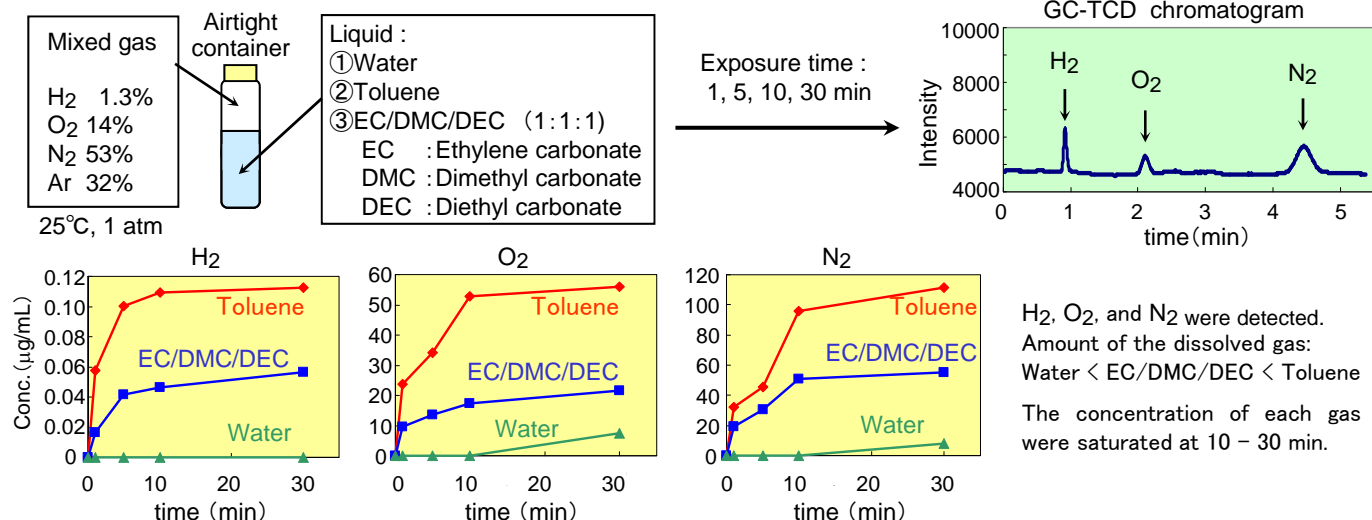


Fig. Time dependence of the dissolved gas in liquids

Temperature dependence of CO₂ gas solubility

CO₂ was dissolved in EC/DMC/DEC by bubbling, then settled at 25, 45, or 65 °C.
The dissolved CO₂ was quantified after the elapsed time of 0, 45, and 90 min.

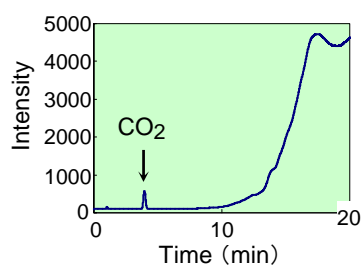
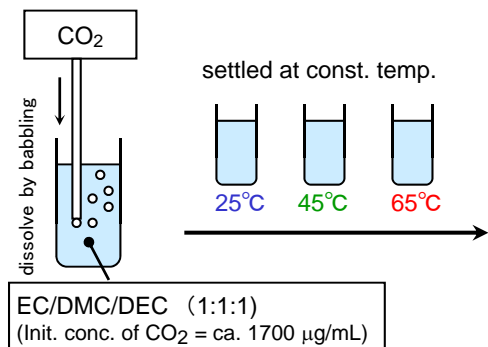


Fig. GC-TCD chromatogram

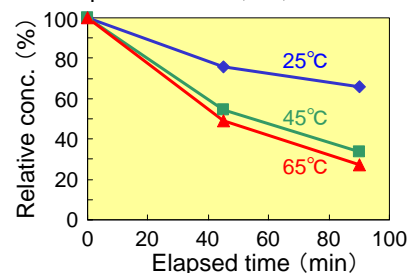


Fig. Concentration of dissolved CO₂ vs. Elapsed time

The amount of the dissolved CO₂ in EC/DMC/DEC was reduced with the elapsed time.
The reduction rate increased with the temperature increase.