

Sampling rates of the activated carbon fiber samplers for organic solvent vapors

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-Abstract-

The adsorbent of passive sampler was used with activated carbon fiber(ACF). And this study was investigated how the humidity(8 ± 3 %RH and 90 ± 5 %RH), solvent vapor concentration(20 ~ 230 ppm) and sampling time(0 ~ 8 hours) could be effect to the change of sampling rates of solvent vapor(toluene, n-hexane, MEK, PCE) at room temperature(24 ± 2 °C). Sampling rates of solvent vapors were based with Fick's diffusion law and investigated with Hirschfelder diffusion coefficient and convection effect within passive sampler was investigated.

At low humidity level(8 ± 3 %RH), sampling rate of MEK was effected and at high humidity level(90 ± 5 %RH), sampling rates of MEK and n-hexane was significantly effected. Sampling rates of toluene, MIBK, PCE which boiling point is above 100 °C was significantly less effected by humidity than those of n-hexane and MEK which is below

100 °C. The sampling rate of n-hexane was effected at high humidity, and MEK was effected at low and high humidity

Solvent vapor concentration had not statistically changed the sampling rates of ACF passive sampler at 20 ~ 230 ppm.

Convection effect in passive sampler could be ignored at experimental concentration range. According to Fick's second law at unsteady state, sampling rates at initial sampling time were high. Those were agreed with the experimental results of ACF passive sampler.

Key Words : passive sampler, activated carbon fiber, humidity effect, concentration effect, time effect, convection effect, diffusion coefficient,