

Degradation of glass fiber filter media exposed to acidic and alkaline contaminants

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Bag house system is usually used to remove particulate matters in flue gas discharged from various combustion facilities. Bag filter installed in a bag house is the most important component to determine the performance of a system. However, the filters are frequently exposed to acidic and alkaline contaminants in flue gas. Therefore, the filament fibers might be degraded by leaching of metallic cations (e.g. Na^+ ions) due to acidic and basic environments.

Bagherpour *et al.* (2009) have shown that the environmental factors would accelerate the rate of thermal degradation during working and storage years.

However, most of previous studies on the degradation are focused on fabricated materials of the reinforcement fibers in a chemical environment (Wei *et al.*, 2010). There are seldom studies about the degradation mechanisms of bag filter media.

In this study, we made an effort to figure out the degradation mechanisms of a glass fiber filter (Teflon B finished glass) exposed to acidic and basic chemicals. The concentration of exposed acid and base (5, 10, 20, 30 wt%) and exposure time (12, 24, 36, 48, 60 hrs) were chosen as effective parameters. The weight loss, tensile strength and elongation were investigated to observe the effects of chemical exposure.

Figure 1 illustrates the weight loss of the glass fiber filter by HCl treatment. As shown in the figure, the weight loss was high at 12 hr exposure under 5% HCl concentration and it maintained plateau. However, the weight loss kept decreasing with exposure time in other conditions.

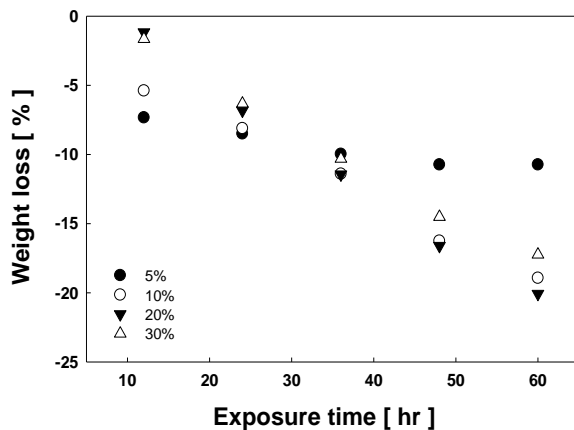


Fig. 1 Weight loss of glass fiber filter by HCl treatment.

Figure 2 shows the weight loss of the glass fiber filter by NaOH treatment. We found that there was no change in weight loss by NaOH exposure.

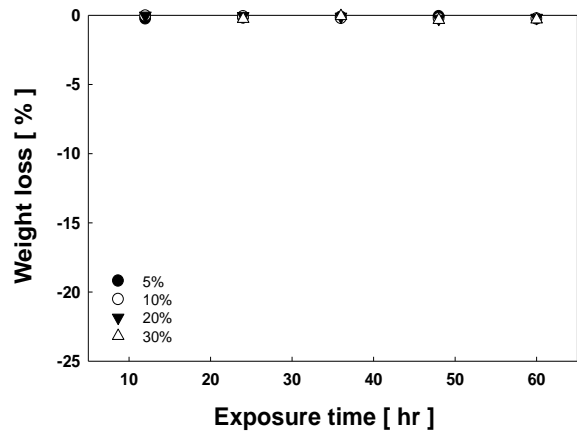


Fig. 2 Weight loss of glass fiber filter by NaOH treatment.

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Bagherpour, S., Bagheri, R. and Saatchi, A. (2009) Mater. Des. 30, 271-274

Wei, B., Cao, H., Song, S. (2010) Mater. Des. 31, 4244-4250.