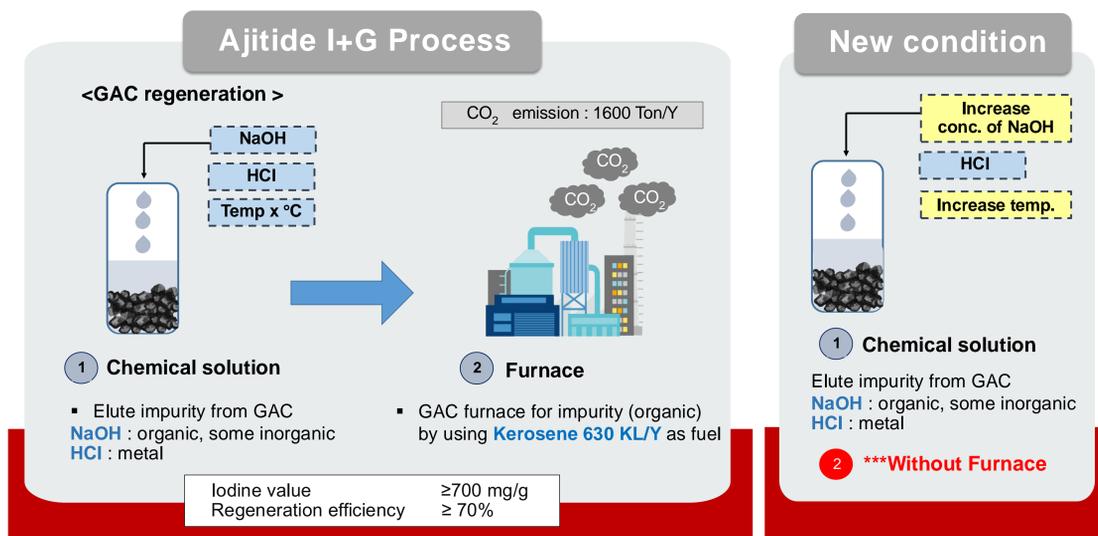


ABSTRACT

This research aims to determine the optimal conditions for the chemical regeneration of granular activated carbon, focusing on reducing carbon dioxide emissions from Ajitide I Plus G production, which is generated in the heat treatment regeneration process. The research focuses on varying the concentration of sodium hydroxide under two conditions: Condition 1 (6%, 8%, 10%) and Condition 2 (15%, 20%, 25%), all at a constant temperature of 80°C. The regeneration efficiency was evaluated using %Regeneration efficiency and iodine value for adsorption capacity examination. The results showed that in Condition 1, a sodium hydroxide concentration of 10% at 80°C provided a %Regeneration efficiency of 70% and an iodine value of 892 mg/g, which were the highest values and achieved the target. In Condition 2, concentrations of 15%, 20%, and 25% at 80°C showed a decrease in %Regeneration efficiency and failing to meet the setup target. Therefore, a sodium hydroxide concentration of 10% at 80°C is recommended as the most suitable condition for the chemical regeneration of granular activated carbon, offering the potential to reduce carbon dioxide emissions by 738 tons per year. However, increasing chemical concentration further may impact the wastewater treatment process, which requires further investigation.

INTRODUCTION



RESULTS

PRELIMINARY STUDY BY BATCH METHOD

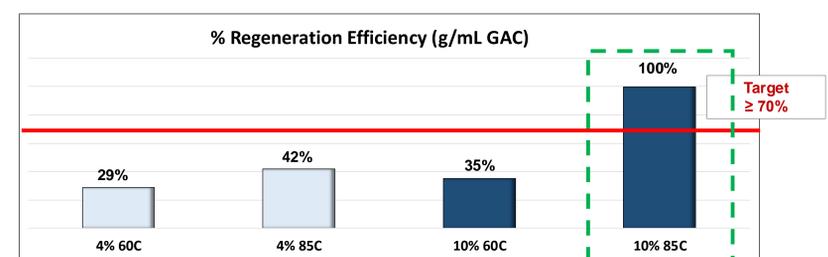


Fig.1 %Regeneration efficiency of using 4% and 10% NaOH, and 60 °C and 85 °C

1st EXPERIMENT ON COLUMN REGENERATION

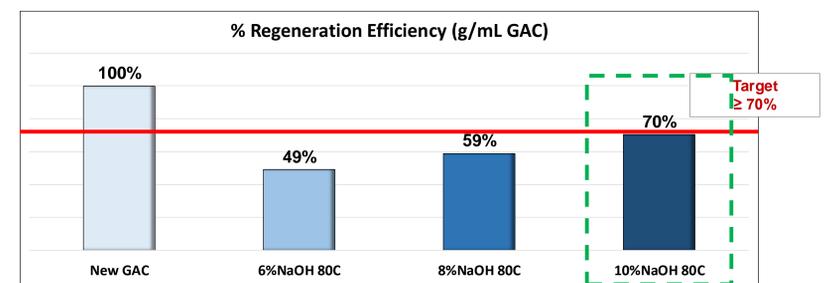


Fig.2 %Regeneration efficiency of 1st experiment

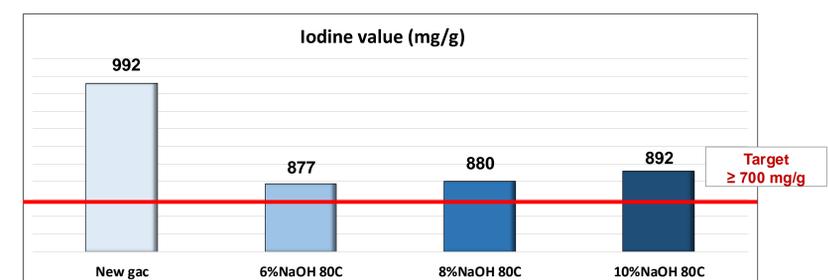
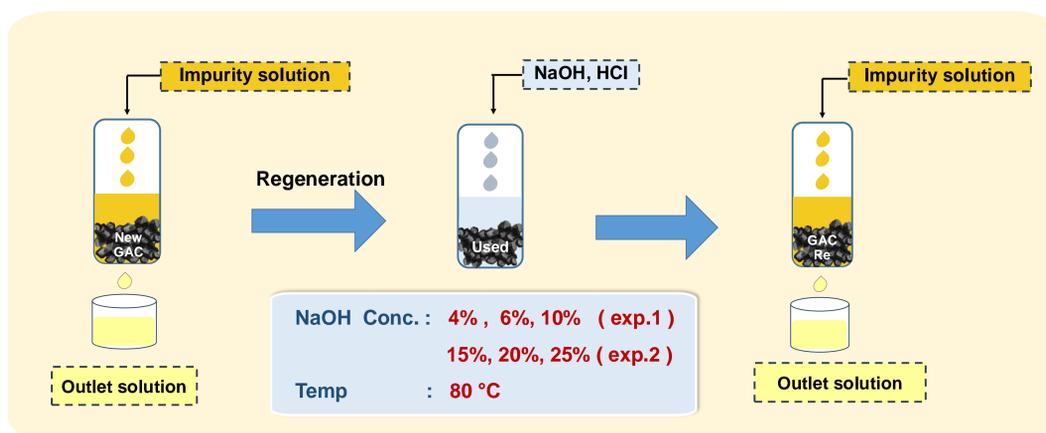


Fig.3 Iodine value of 1st experiment

1st and 2nd EXPERIMENT ON COLUMN REGENERATION



2nd EXPERIMENT ON COLUMN REGENERATION

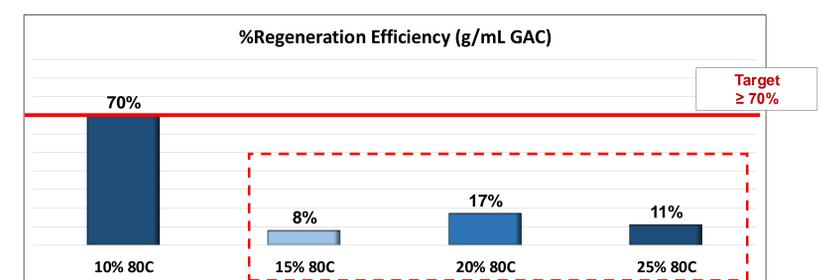


Fig.4 %Regeneration efficiency of 2nd experiment

CONCLUSION

- At 10% NaOH and 80°C, the regeneration efficiency and iodine value reached the target, indicating that this is a suitable chemical regeneration condition without the need of a furnace.

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