

CHAPTER V

CONCLUSIONS

Pure-phase zeolites A, X, and Y in sodium forms were successfully synthesized from silica gel waste by the conventional hydrothermal method. The synthesized zeolites demonstrated excellent CO₂ adsorption capacities, achieving 4.10 mmol/g for NaA, 5.84 mmol/g for NaX, and 4.39 mmol/g for NaY. Notably, the synthetic NaX zeolite exhibited a higher adsorption capacity (5.84 mmol/g) compared to its commercial counterpart (5.70 mmol/g). The CO₂ adsorption behavior of both synthesized and commercial NaA zeolites is well-described by the Toth model. Meanwhile, the Langmuir-Freundlich adsorption model provided the best fit for CO₂ adsorption in both synthesized and commercial NaX and NaY zeolites. These results demonstrate that zeolites synthesized from silica gel waste are highly effective for CO₂ capture.