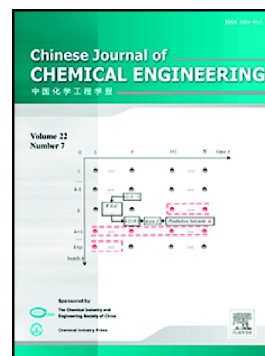


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Separation Science and Engineering

## **Evaluation of solvent-mediated phase transformation of glycine using oleic acid: Morphology and characterization study**

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### **ABSTRACT**

The polymorphic phase transformation of  $\beta$ -glycine to  $\alpha$ -glycine was carried out both in the absence and presence of various concentrations of oleic acid used as additive at 25°C in a water/ethanol medium. The effects of oleic acid and its concentration on phase transformation time were determined by continuously measuring the ultrasonic velocity. The crystals obtained by the completion of the phase transformation were characterized by XRD, SEM, and TG/DTG. The XRD and SEM results indicated that oleic acid significantly impacted phase transformation time and the morphological characteristics of the crystals. In addition to SEM analysis, detailed crystal shape analysis was performed and the circularity, elongation, and convexity parameters were determined quantitatively. TG/DTG analyses were performed to investigate thermal decomposition behavior and to calculate the activation energies based on different kinetic models such as FWO, KAS, Starink, and Tang kinetic models. With the addition of oleic acid to the medium, the calculated activation energy values increased from 89.63–90.63 to 153.8–155.4 kJ·mol<sup>-1</sup>. The activation energy values showed that oleic acid was adsorbed on the crystal surface; this result was supported by FTIR, elemental, and Kjeldahl analyses.

**Keywords.** Glycine, oleic acid, crystallization, isoconversional methods, phase transformation

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