

# Spherical Binderless 4A/5A Zeolite Assemblies: Synthesis, Characterization, and Adsorbent Applications

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## Supplementary figures

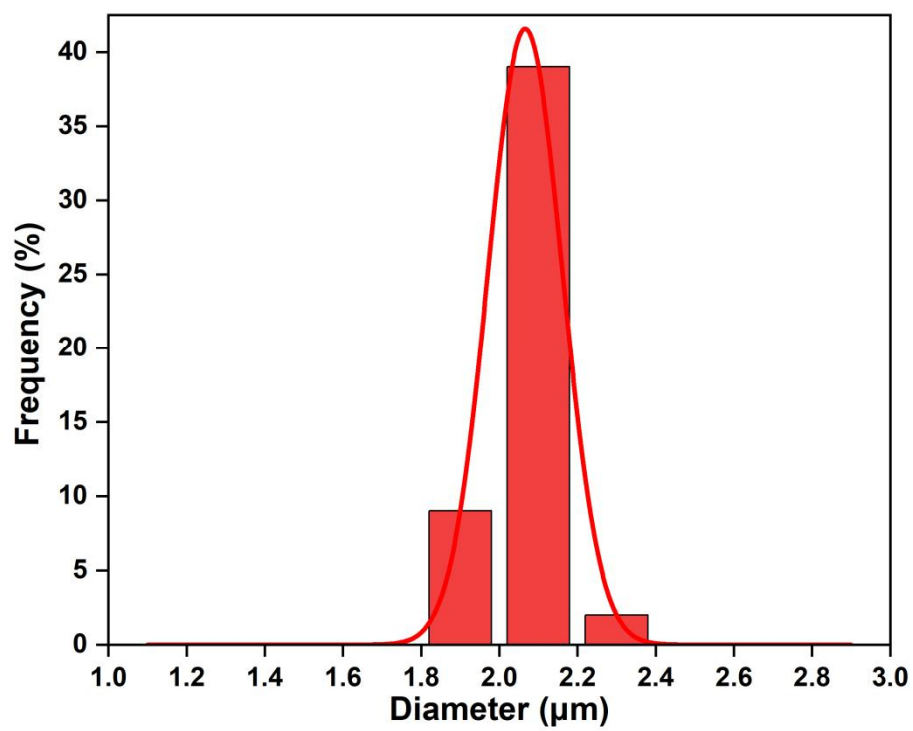


Figure S1. Particle size distribution of S-2 silica microspheres.

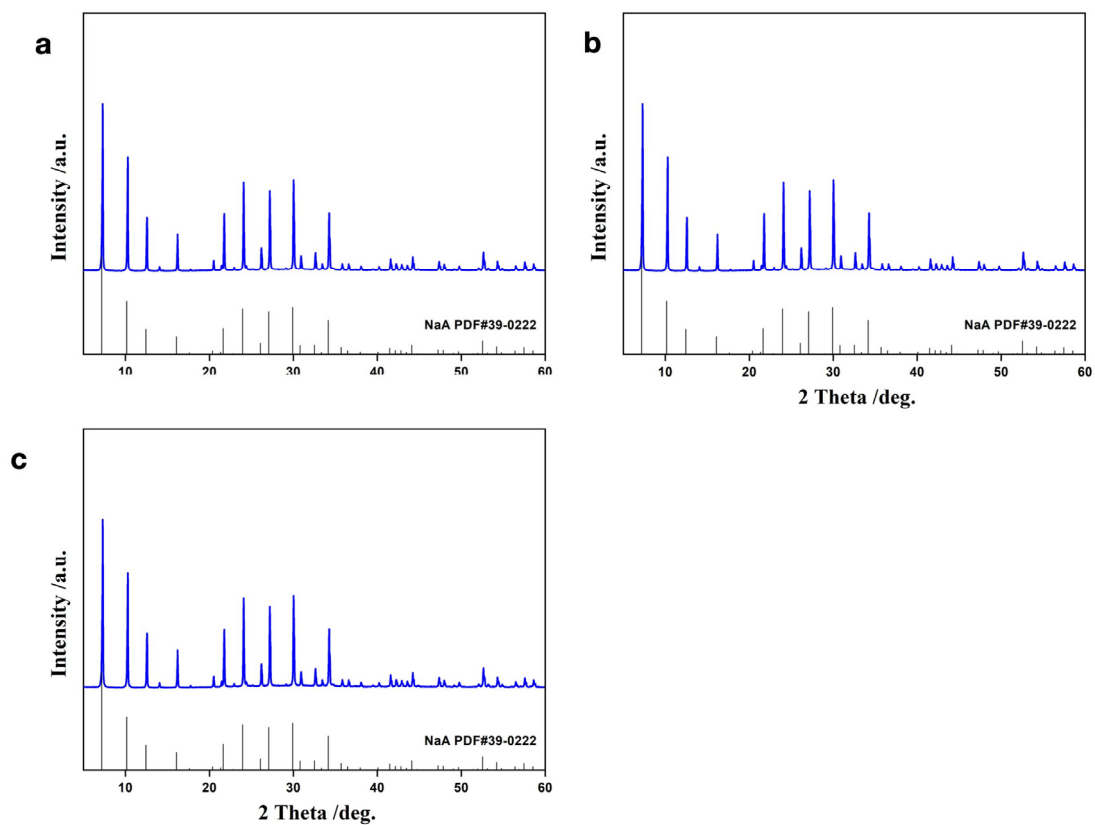


Figure S2. XRD pattern of zeolite microspheres synthesized from S-2 under different pretreatments corresponding to those of Figure 2: (a) Macroporous cubic crystals obtained by aging at room temperature for 10 min; (b) Incompletely crystallized spherical NaA assemblies by aging at 0°C for 10 min; (c) Crystallized NaA microspheres by aging at 0°C for 30 min.

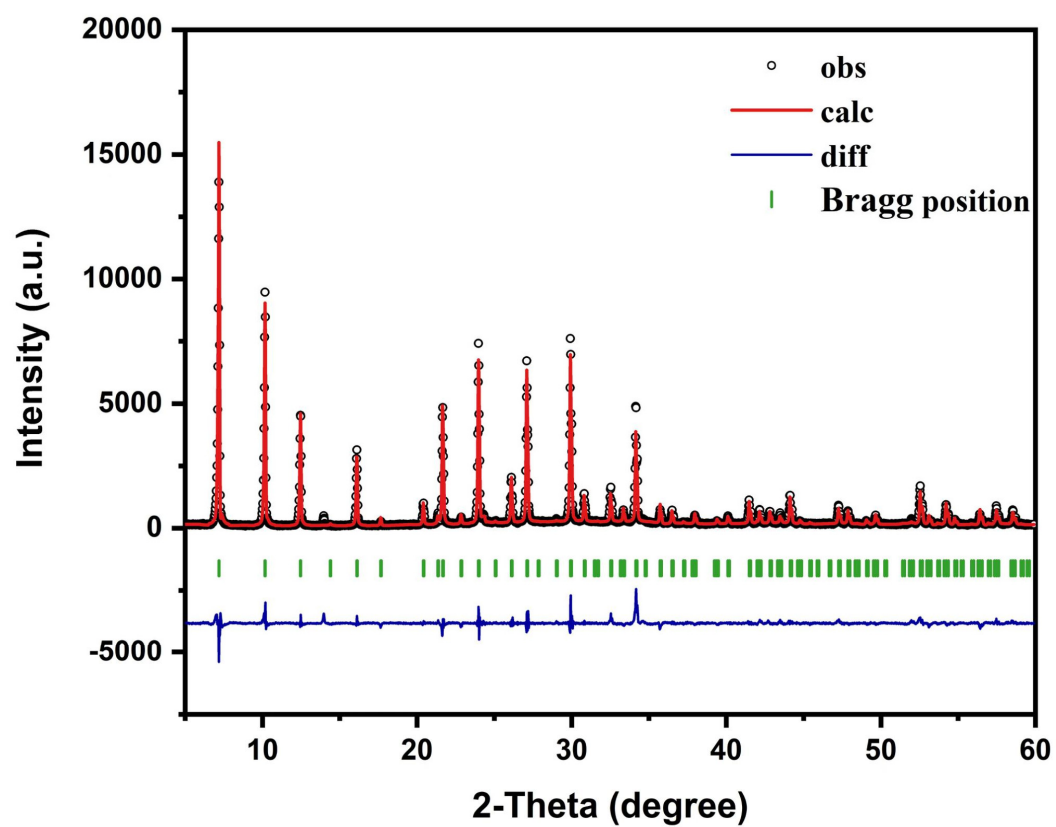


Figure S3. Rietveld refinement fitting on the room temperature powder XRD pattern of NaA-2.

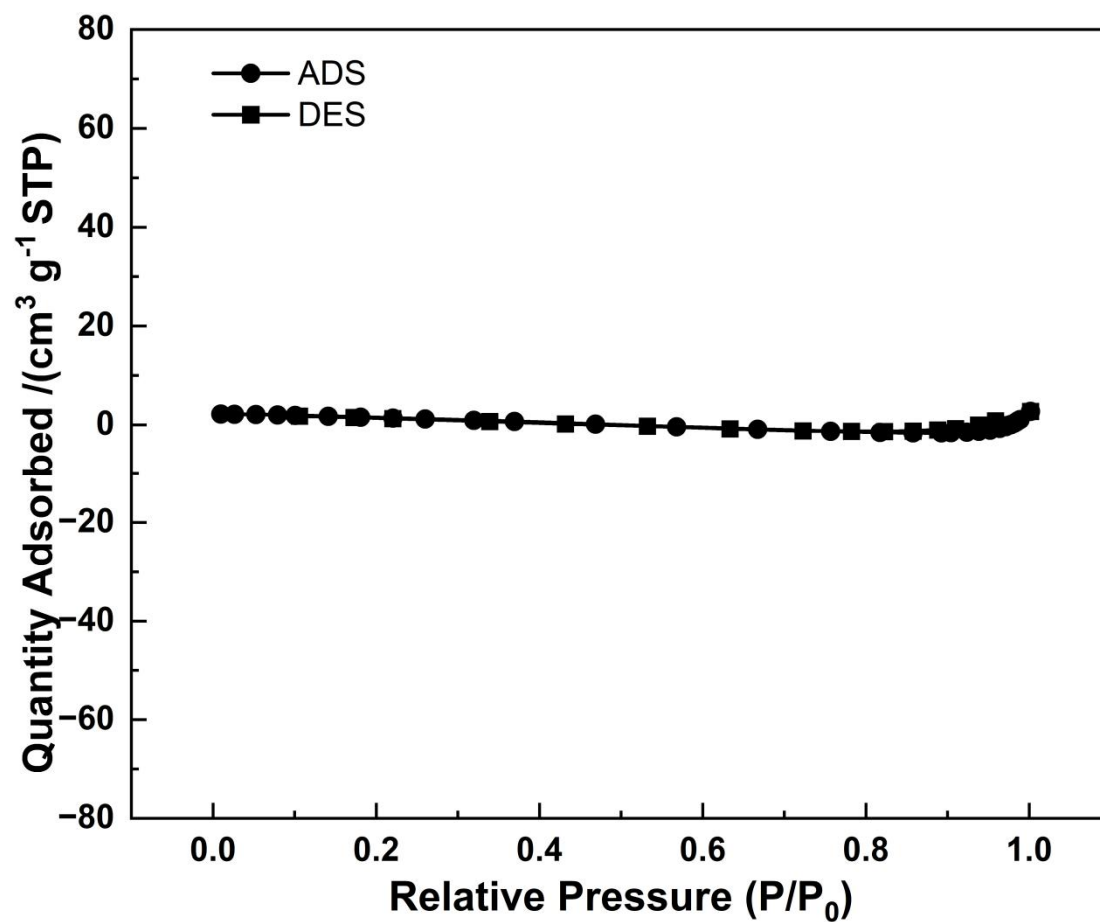


Figure S4. N<sub>2</sub> adsorption-desorption isotherms at -196 °C of NaA-2 zeolite microspheres.

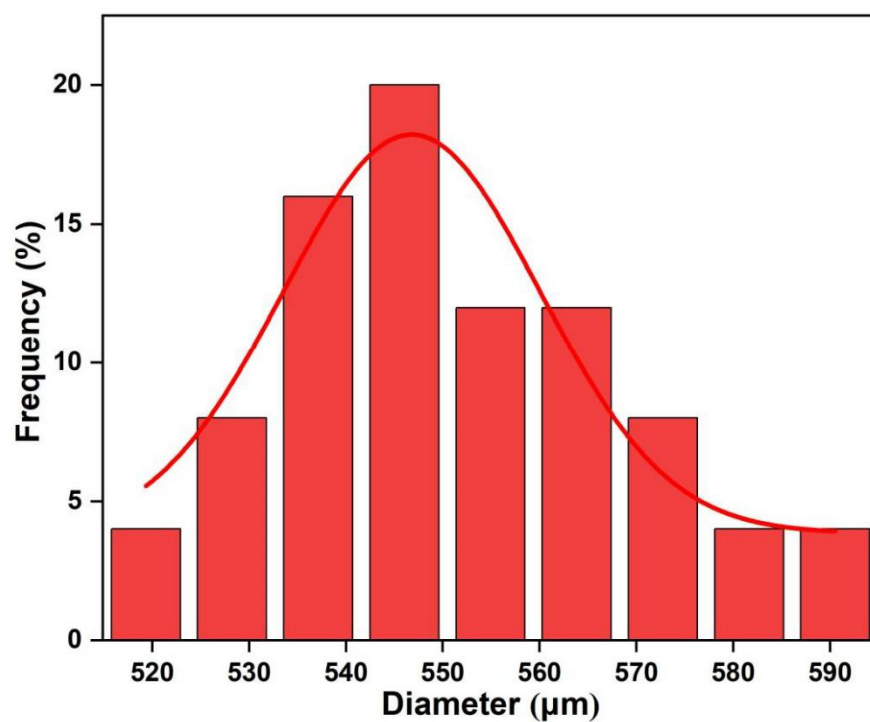


Figure S5. Particle size distribution of S-500 silica microspheres.

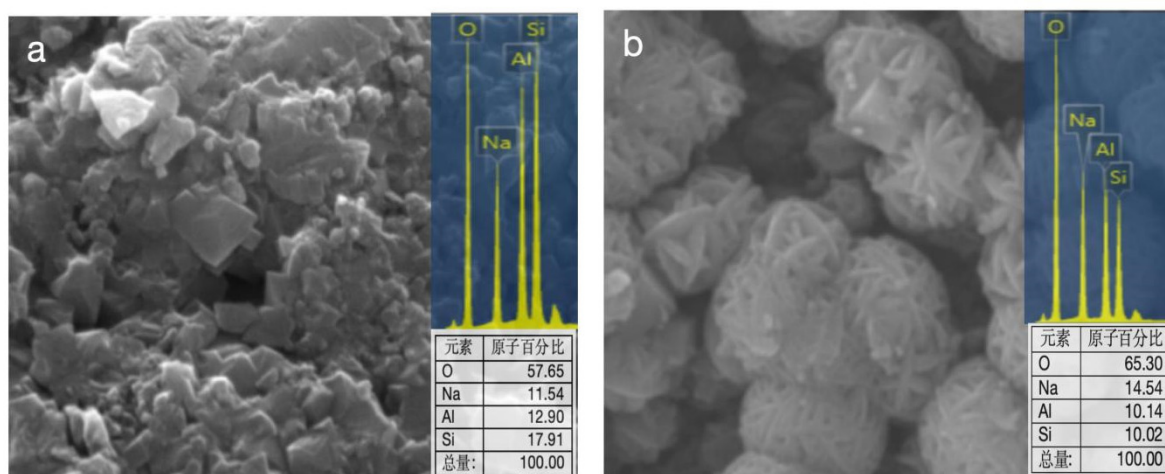


Figure S6. The EDS mapping results of NaA spheres obtained from conventional impregnation indicating uneven Si/Al ratios: (a) inner core, (b) external surface.

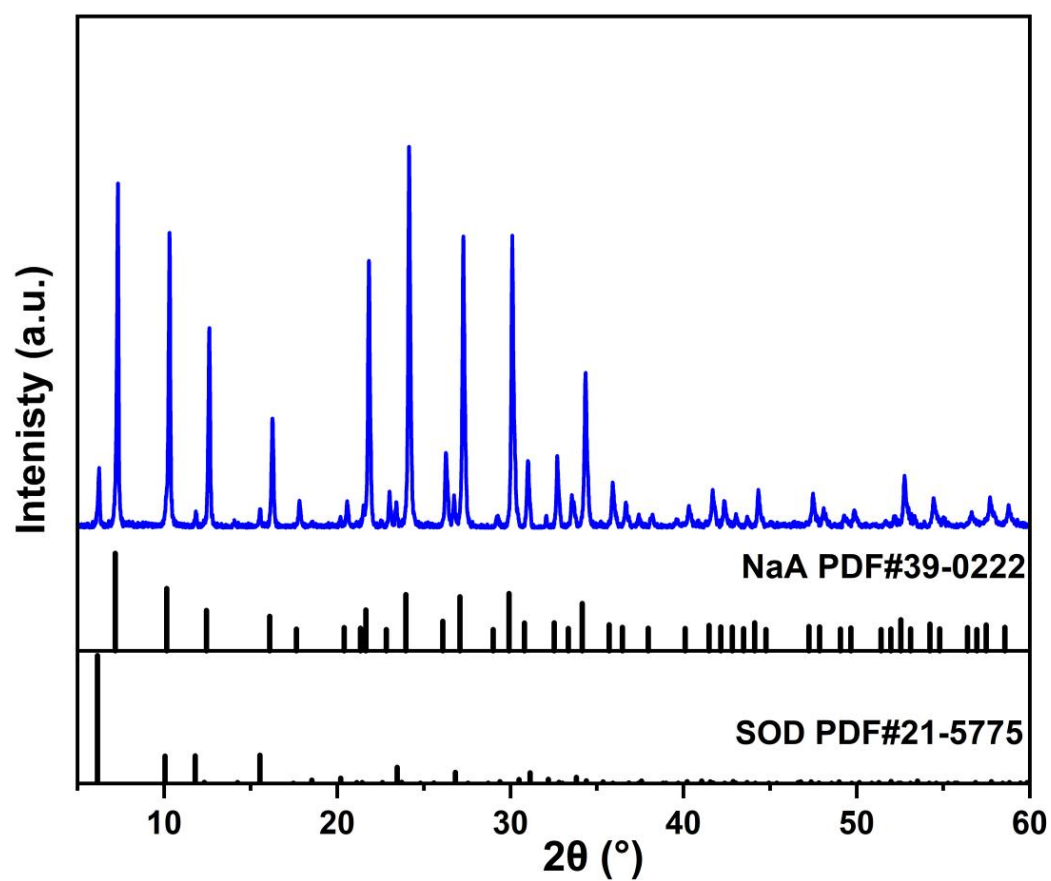


Figure S7. XRD pattern of zeolite microspheres synthesized with ultrasound pretreatment and SAC for 8 h showing SOD impurity.

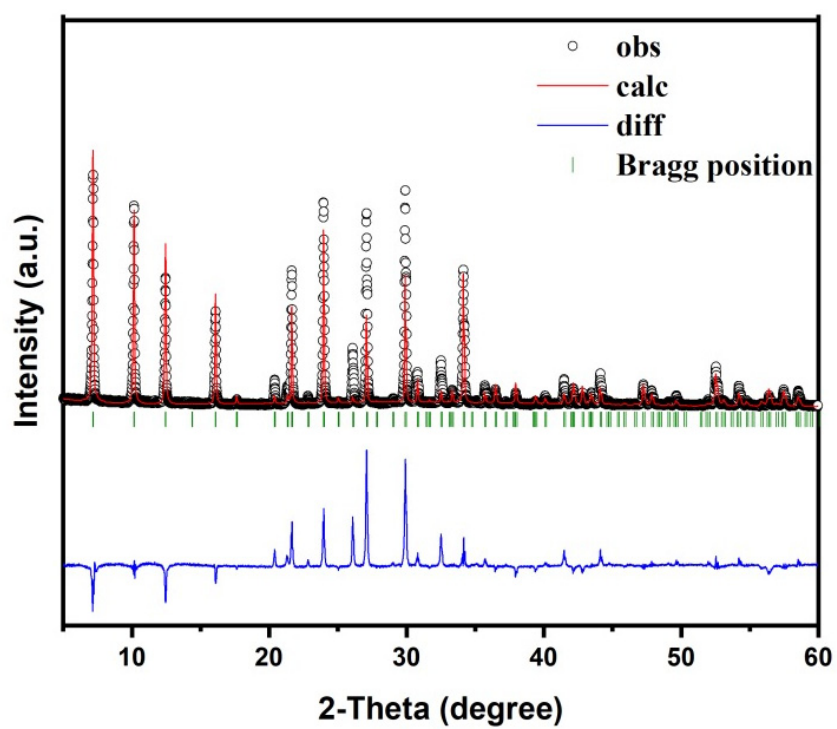


Figure S8. Rietveld refinement fitting on the room temperature powder XRD pattern of NaA-500

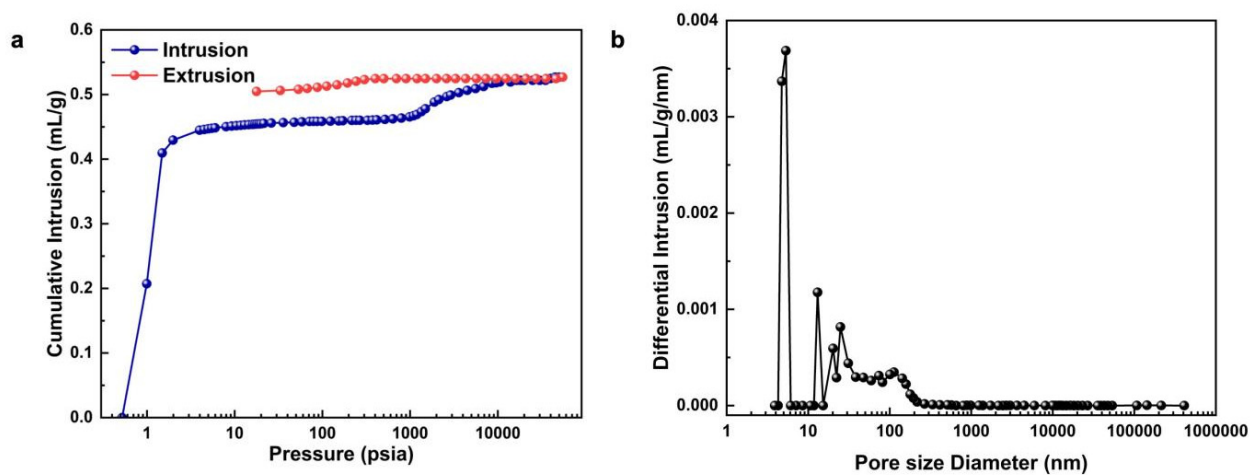


Figure S9. (a) mercury intrusion porosimetry, and the corresponding (b) pore size distribution of NaA-500.

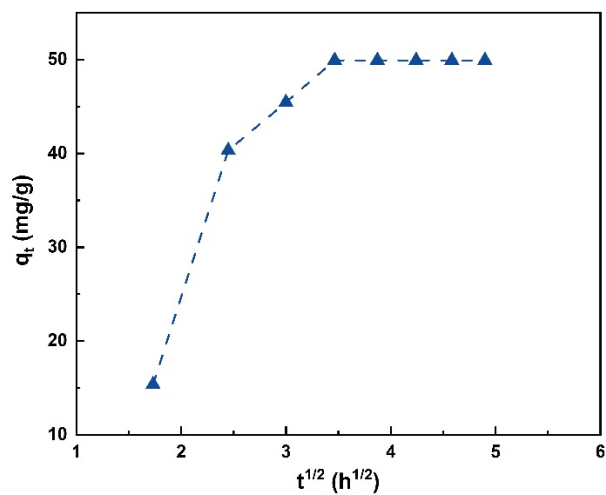


Figure S10. Plot of  $q_t$  versus  $t^{1/2}$  for ammonia nitrogen adsorption on NaA-500 zeolite microsphere for analyzing intraparticle diffusion.



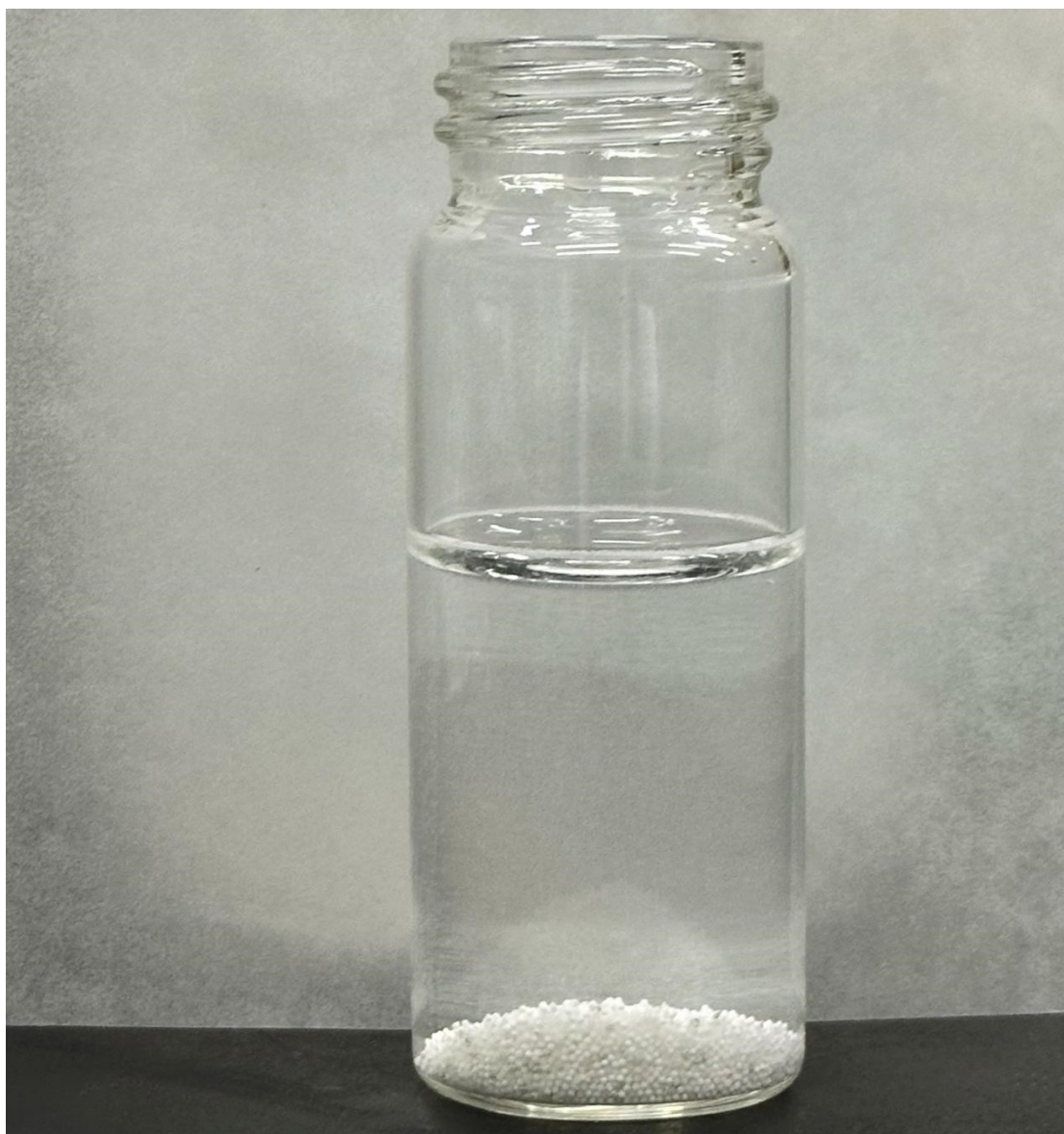


Figure S11. Digital photo of the NaA-500 sample for removal of ammonia nitrogen that could be separated by sedimentation.