

**Synthesis and adsorptive properties of sulfonated nanocomposites based on carbon-encapsulated iron nanoparticles and styrene-*p*-divinylbenzene copolymer**

**Supplementary Data**

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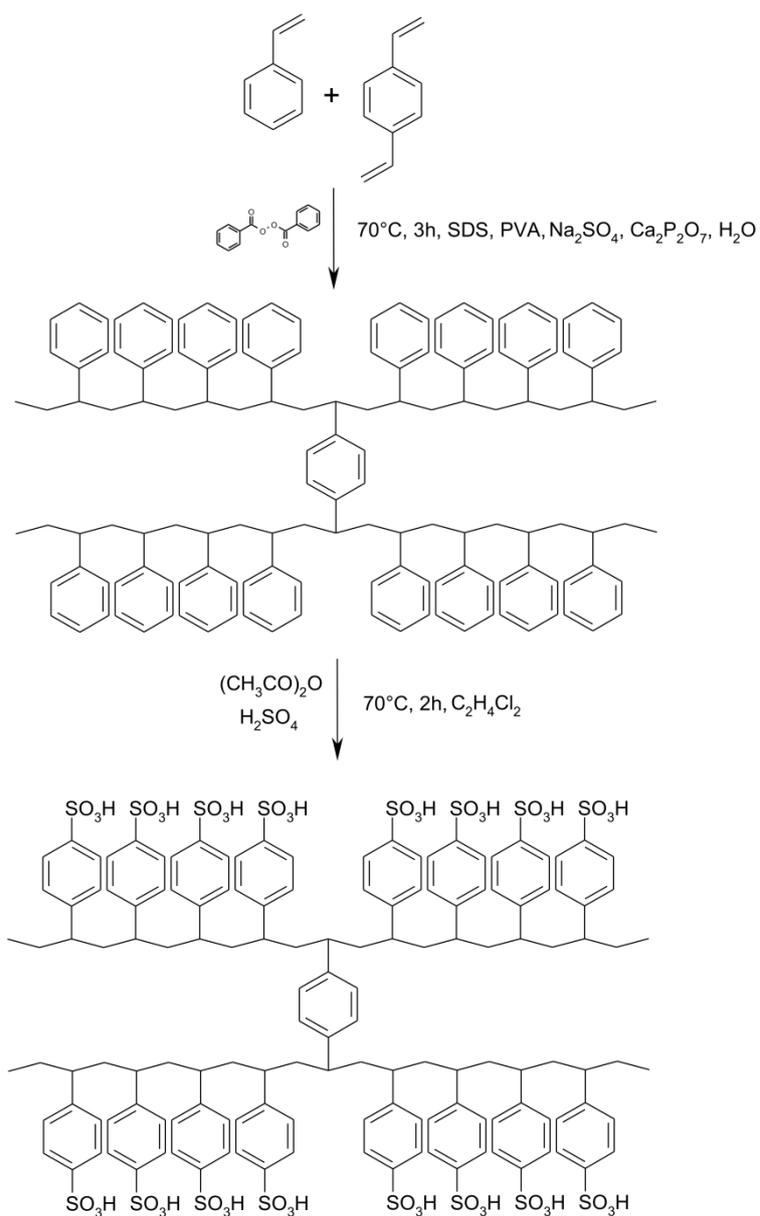
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## Reaction path



Formation of sulfonating agent:

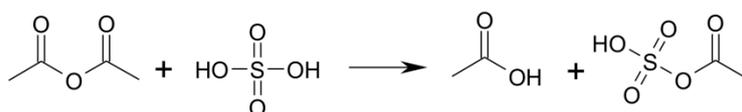


Figure S1. Reaction path (idealized) leading to obtain sulfonated cross-linked copolymer of styrene and *p*-divinylbenzene.

## Adsorption/desorption isotherms of nitrogen vapor at 77K and pore distribution diagrams

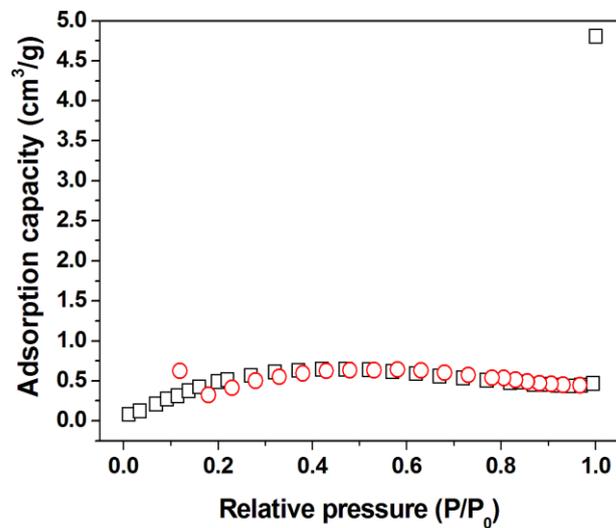


Figure S2. Adsorption/desorption isotherm of nitrogen vapor at 77K onto sulfonated polymer. Red points are connected with desorption, black with adsorption.

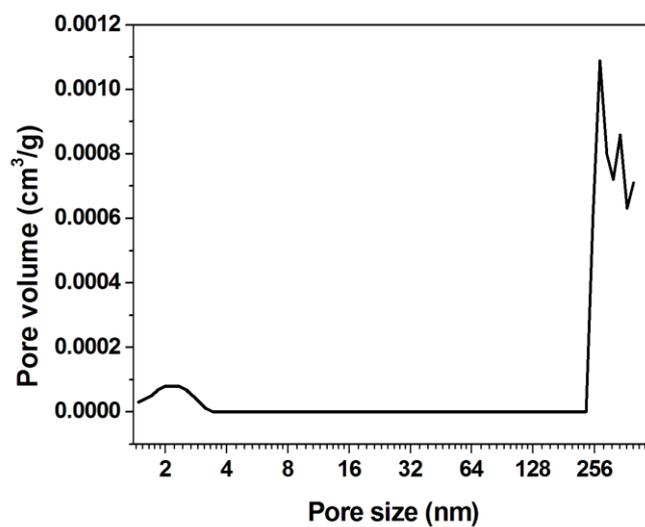


Figure S3. Pore distribution diagram for sulfonated polymer.

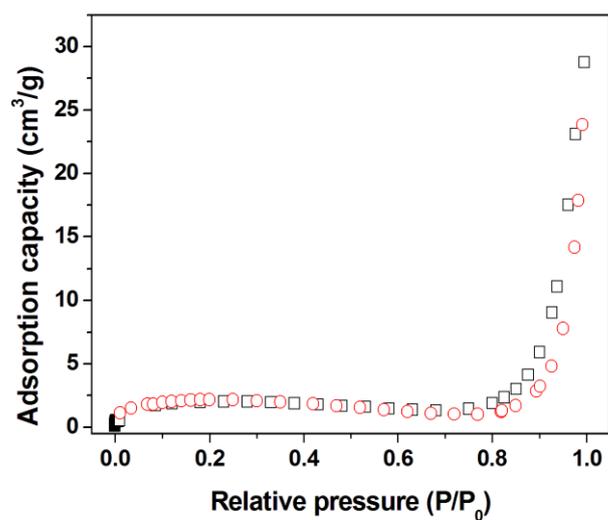


Figure S4. Adsorption/desorption isotherm of nitrogen vapor at 77K onto SMNCA-10. Red points are connected with desorption, black with adsorption.

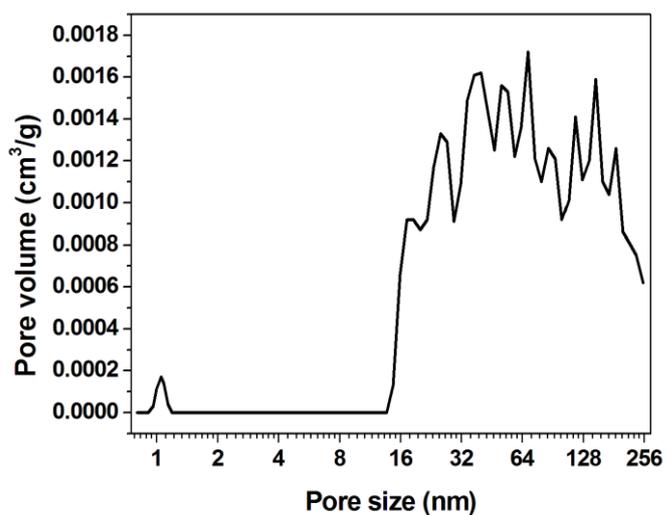


Figure S5. Pore distribution diagram for SMNCA-10.

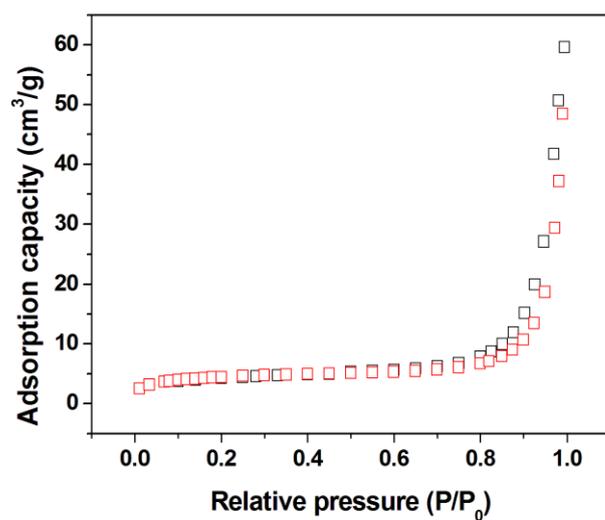


Figure S6. Adsorption/desorption isotherm of nitrogen vapor at 77K onto SMNCA-18. Red points are connected with desorption, black with adsorption.

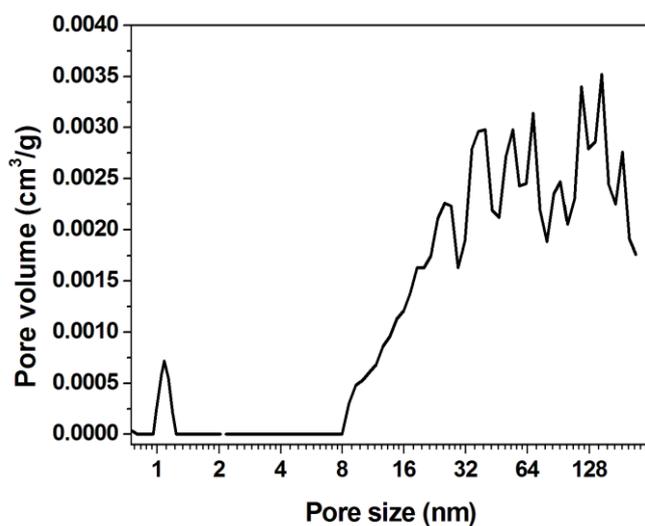


Figure S7. Pore distribution diagram for SMNCA-18.

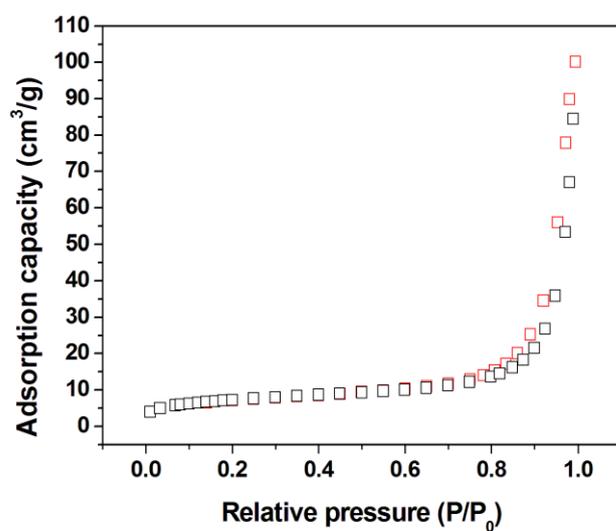


Figure S8. Adsorption/desorption isotherm of nitrogen vapor at 77K onto SMNCA-31. Red points are connected with desorption, black with adsorption.

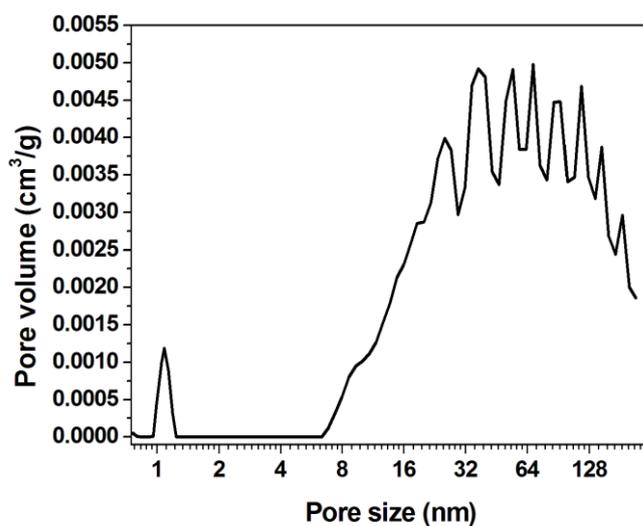


Figure S9. Pore distribution diagram for SMNCA-31.

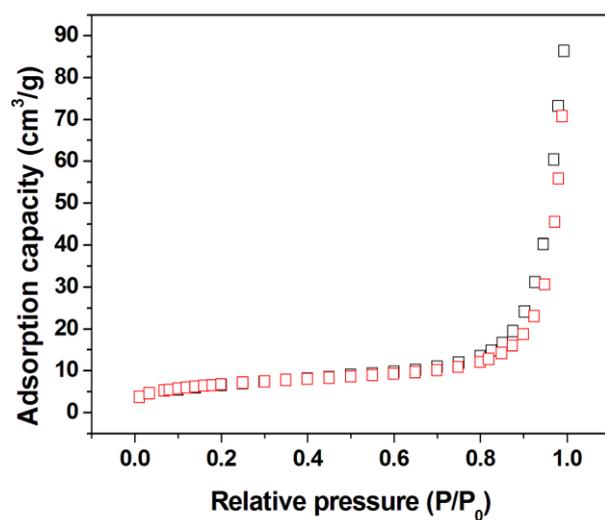


Figure S10. Adsorption/desorption isotherm of nitrogen vapor at 77K onto SMNCA-36. Red points are connected with desorption, black with adsorption.

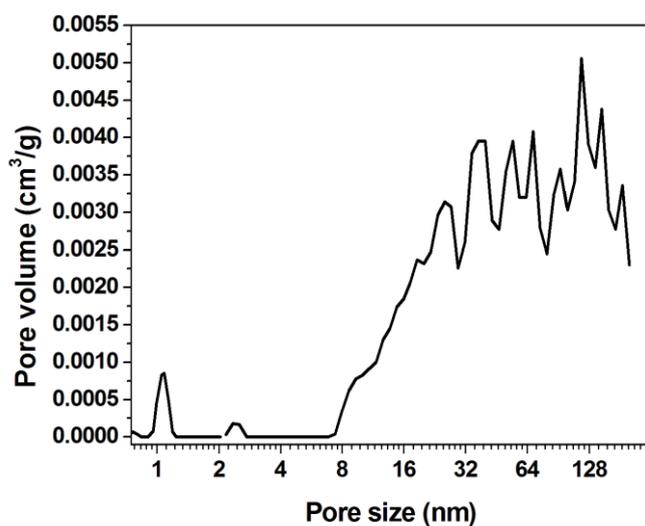


Figure S11. Pore distribution diagram for SMNCA-36.

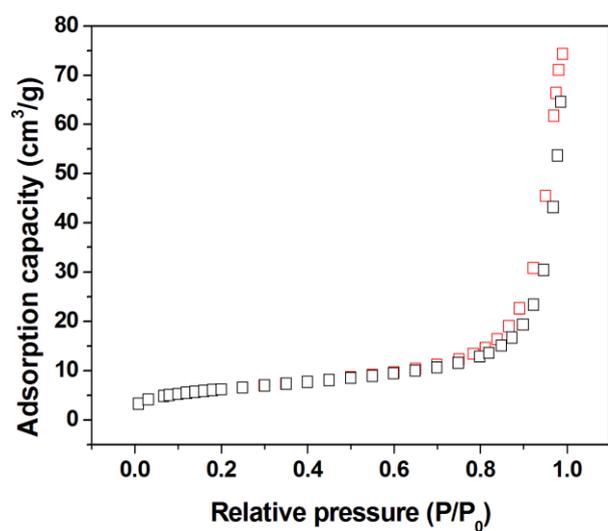


Figure S12. Adsorption/desorption isotherm of nitrogen vapor at 77K onto SMNCA-40. Red points are connected with desorption, black with adsorption.

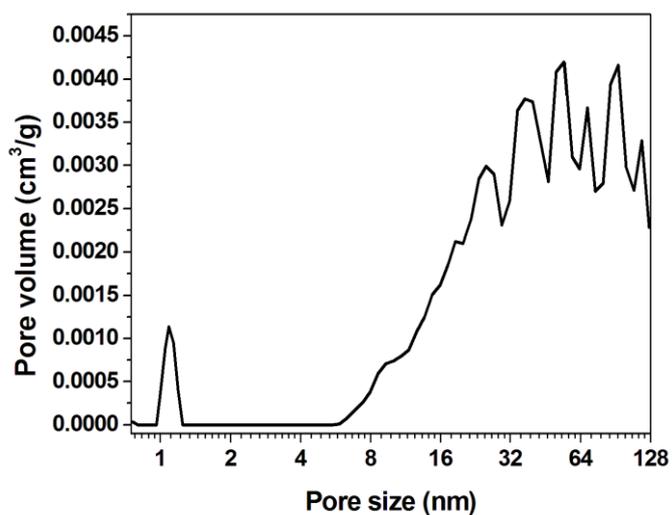


Figure S13. Pore distribution diagram for SMNCA-40.

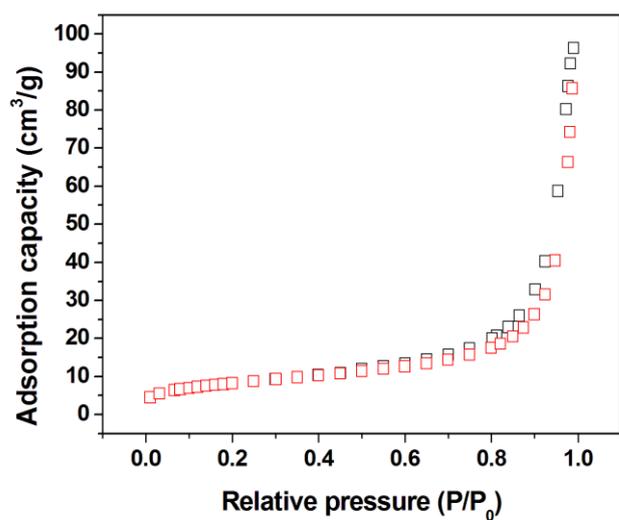


Figure S14. Adsorption/desorption isotherm of nitrogen vapor at 77K onto SMNCA-47. Red points are connected with desorption, black with adsorption.

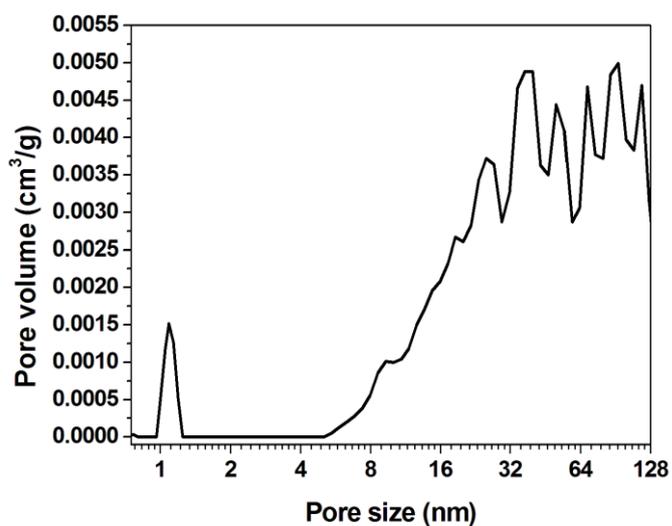


Figure S15. Pore distribution diagram for SMNCA-47.

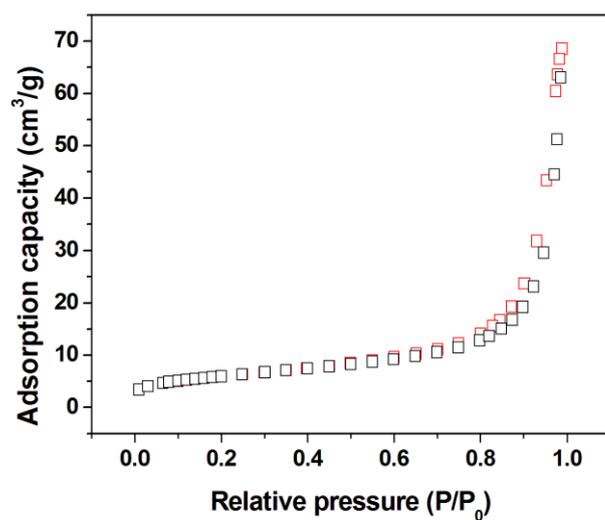


Figure S16. Adsorption/desorption isotherm of nitrogen vapor at 77K onto SMNCA-53. Red points are connected with desorption, black with adsorption.

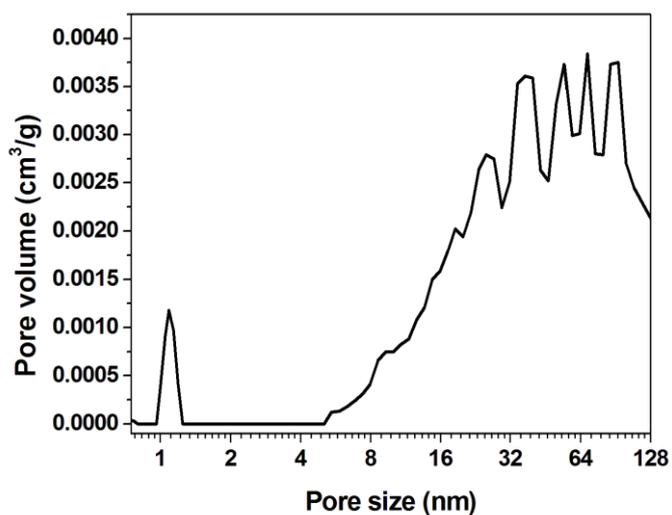


Figure S17. Pore distribution diagram for SMNCA-53.

## Adsorption/desorption isotherms of nitrogen vapor at 77K and pore distribution diagrams for Amberlite IR 120 Na resin

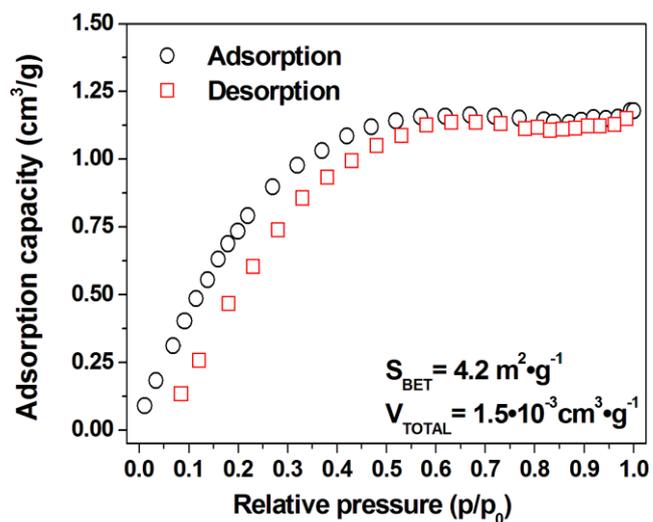


Figure S18. Adsorption/desorption isotherm of nitrogen vapor at 77K onto Amberlite IR 120 Na.

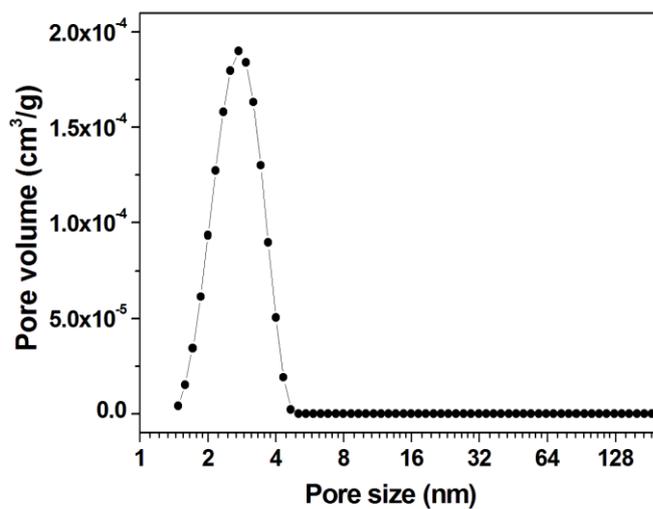


Figure S19. Pore distribution diagram for Amberlite IR 120 Na.

## Magnetic hysteresis loops

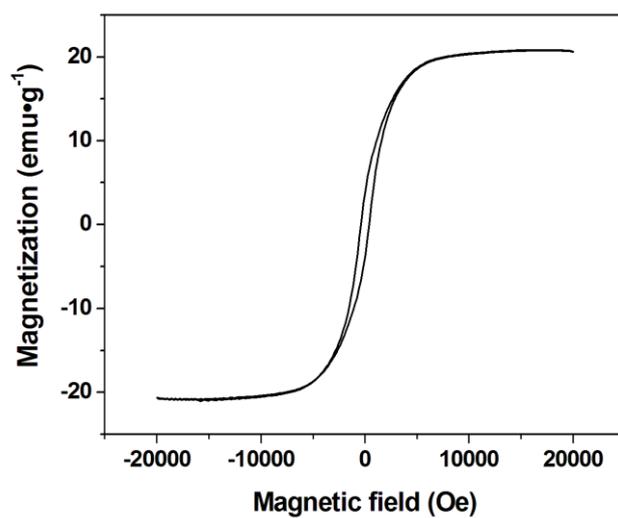


Figure S20. Magnetic hysteresis loop for SMNCA-10.

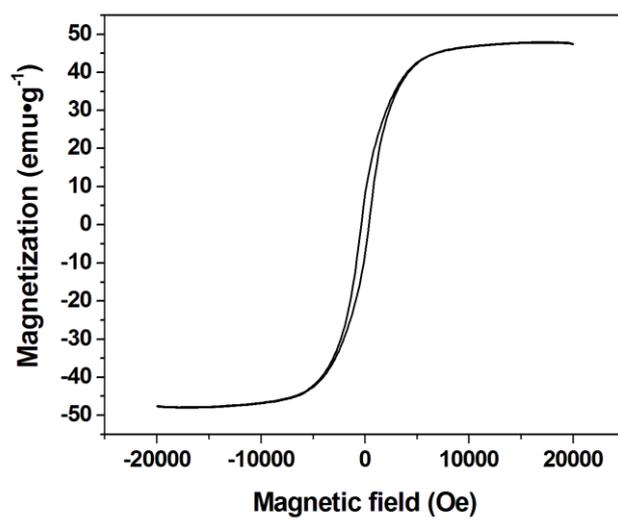


Figure S21. Magnetic hysteresis loop for SMNCA-18.

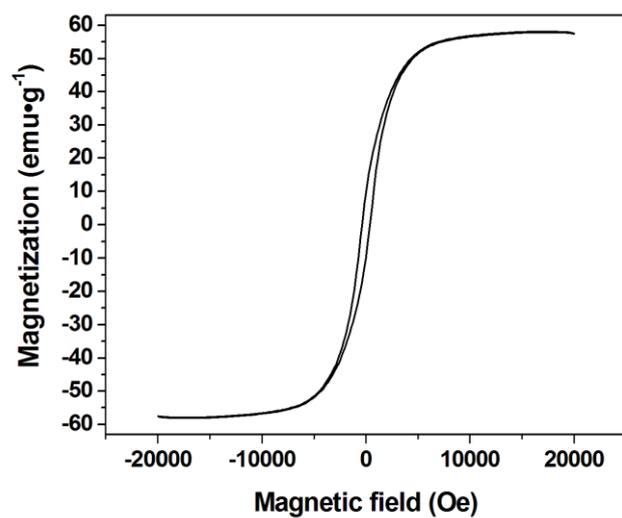


Figure S22. Magnetic hysteresis loop for SMNCA-31.

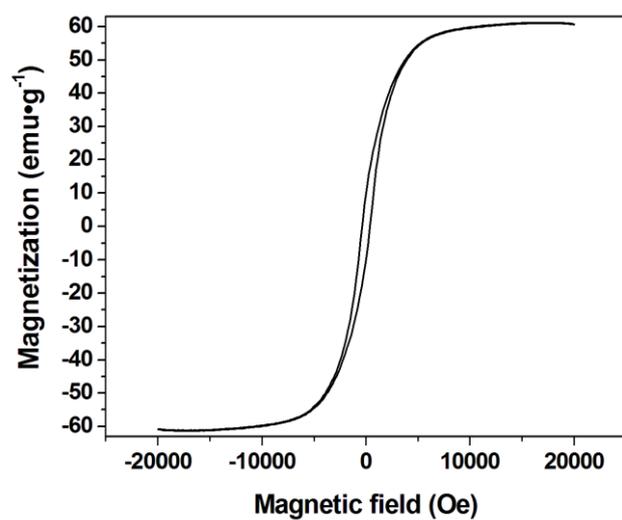


Figure S23. Magnetic hysteresis loop for SMNCA-36.

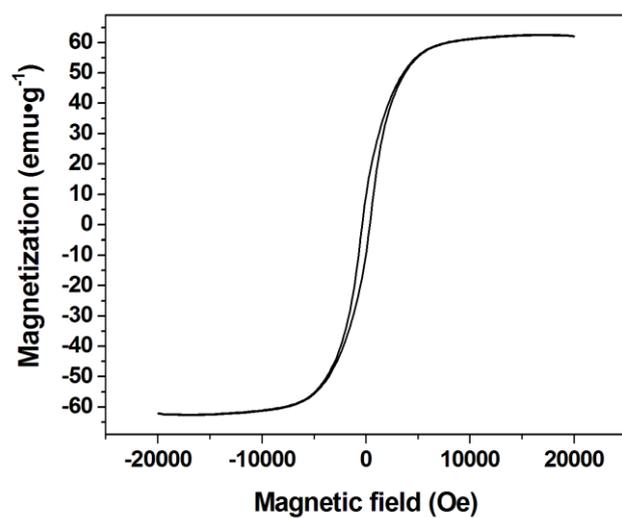


Figure S24. Magnetic hysteresis loop for SMNCA-40.

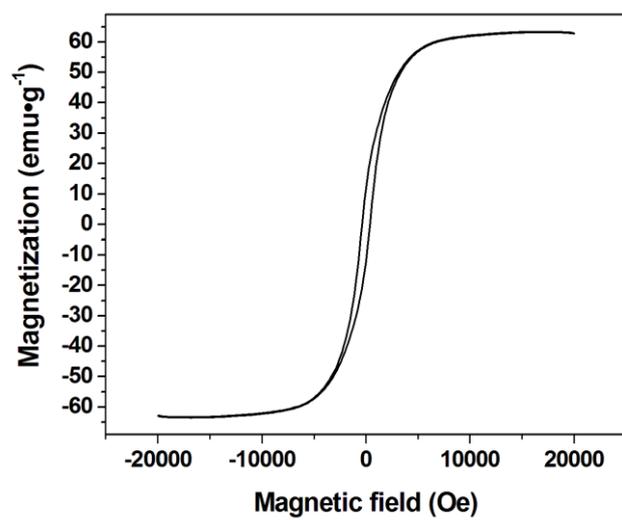


Figure S25. Magnetic hysteresis loop for SMNCA-47.

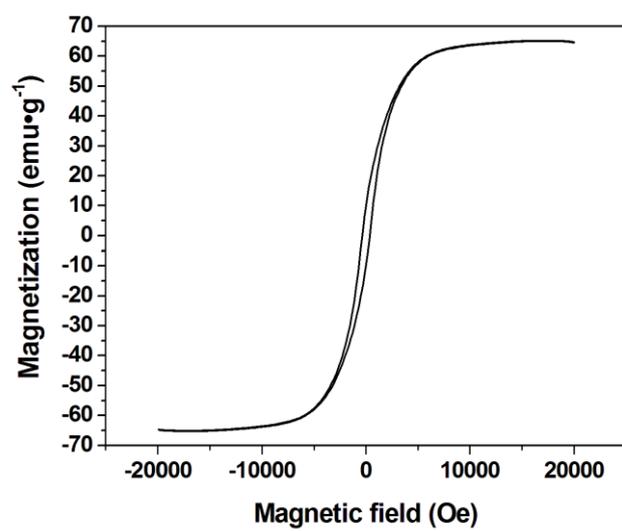


Figure S26. Magnetic hysteresis loop for SMNCA-53.

## Acid-base properties

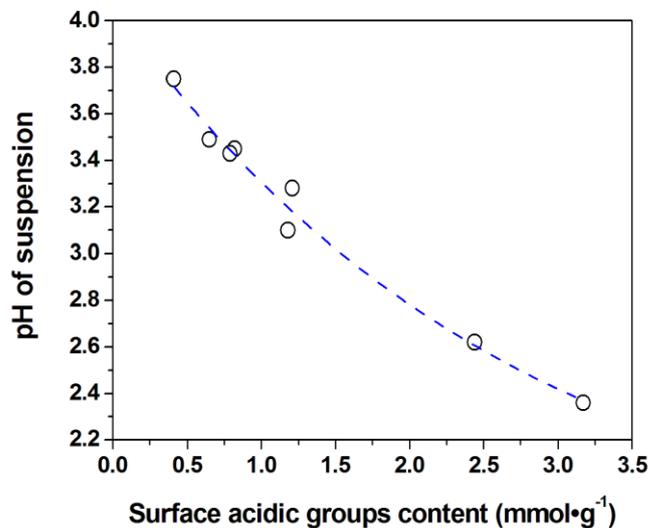


Figure S27. Relation between pH of nanocomposite suspension and surface acidic groups content.

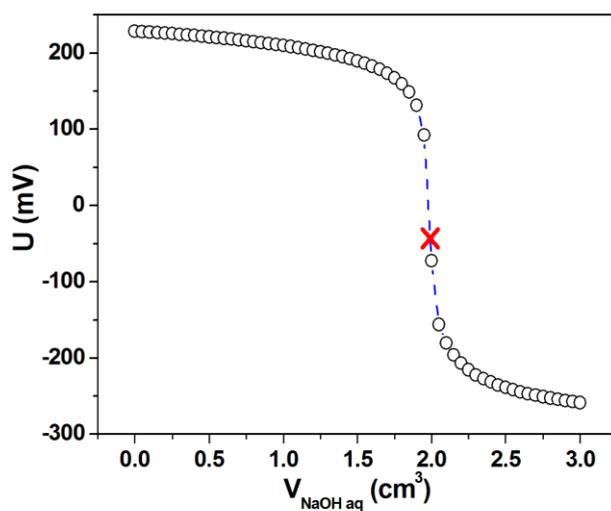


Figure S28. Titration curve for sulfonated copolymer of styrene and *p*-divinylbenzene.  
Red cross marks the equilibrium point.

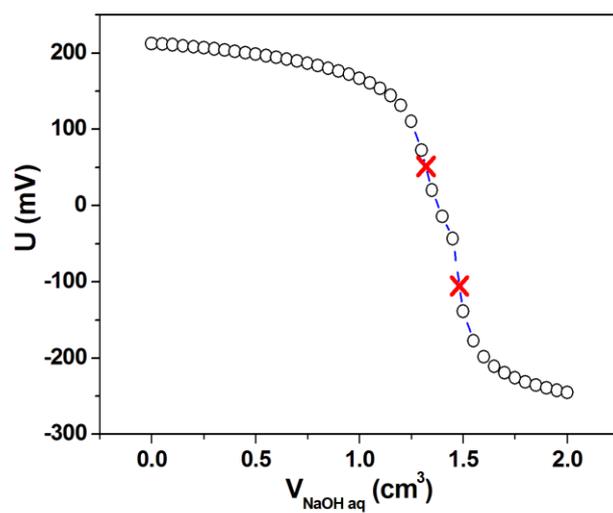


Figure S29. Titration curve for SMNCA-10. Red crosses mark the equilibrium points.

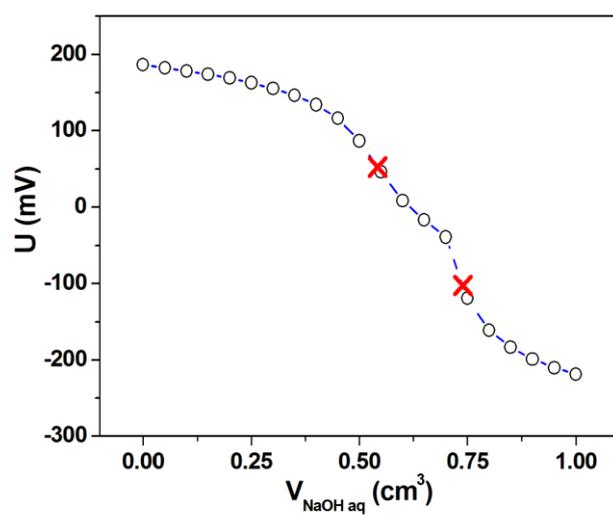


Figure S30. Titration curve for SMNCA-18. Red crosses mark the equilibrium points.

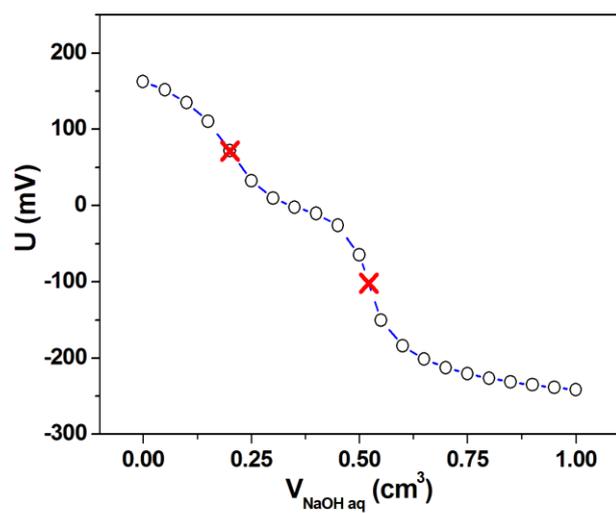


Figure S31. Titration curve for SMNCA-31. Red crosses mark the equilibrium points.

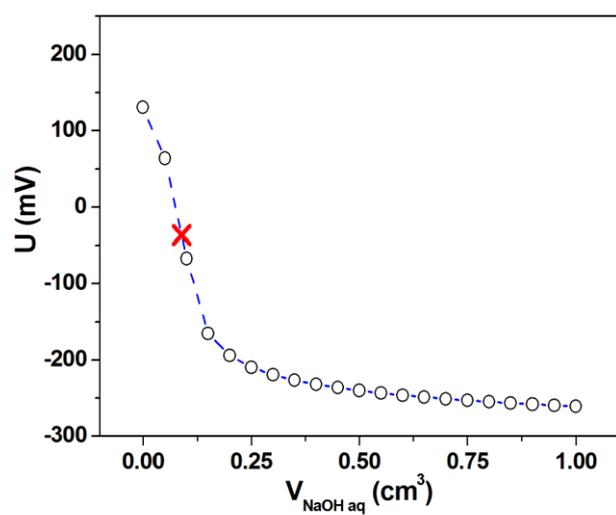


Figure S32. Titration curve for SMNCA-36. Red cross marks the equilibrium points.

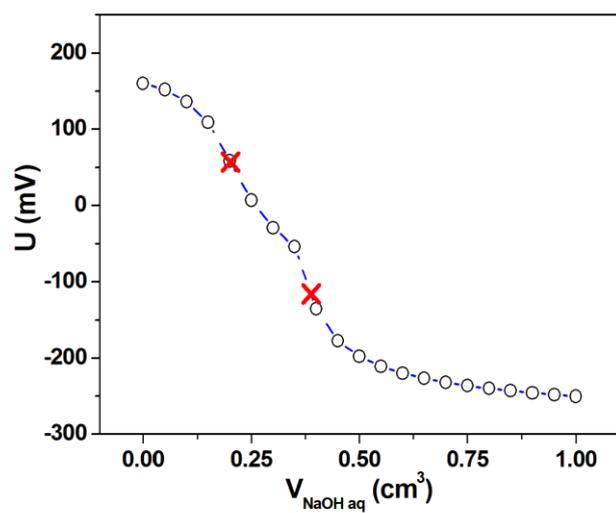


Figure S33. Titration curve for SMNCA-40. Red crosses mark the equilibrium points.

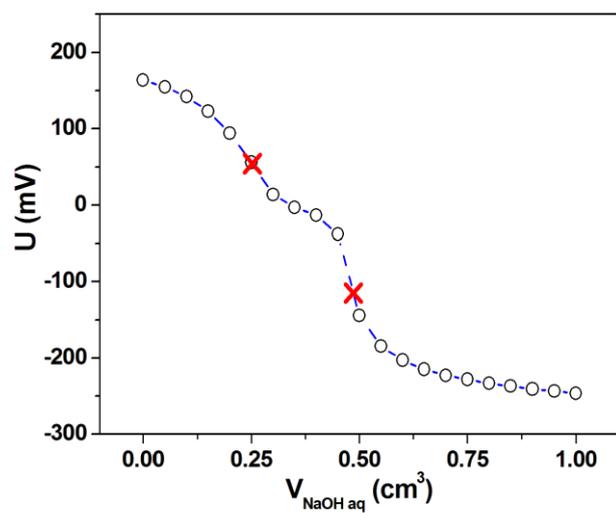


Figure S34. Titration curve for SMNCA-47. Red crosses mark the equilibrium points.

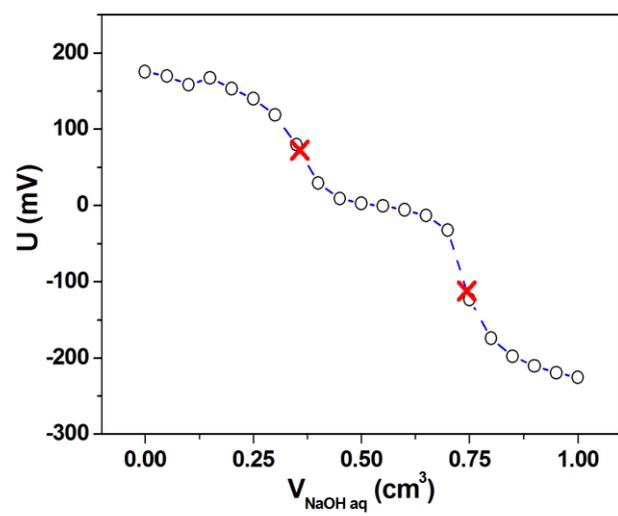


Figure S35. Titration curve for SMNCA-53. Red crosses mark the equilibrium points.