Supporting information

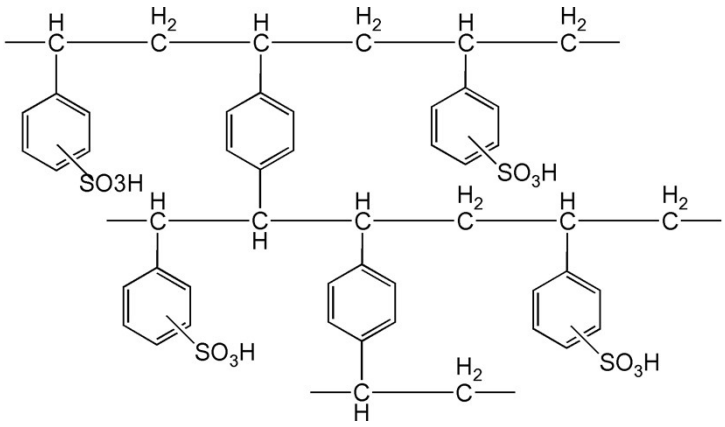
Carbon beads with well-defined pore structure derived from ion-exchange resin beads

Ping He,[a] Kok-Giap Haw,[a] Shichen Yan,[a] Lingxue Tang,[a] Qianrong Fang,[a] Shilun Qiu,[a] Valentin Valtchev[a,b*]

[a]State Key Laboratory of Inorganic Synthesis and Preparative Chemistry, Jilin University, Changchun 130012, China.

[b]Normandie Univ, ENSICAEN, UNICAEN, CNRS, Laboratoire Catalyse et Spectrochimie, 6 Marechal Juin, 14050 Caen, France.

E-mail: valentin.valtchev@ensicaen.fr



Scheme S1. Chemical structure (H-form) of the cation exchange resin beads.

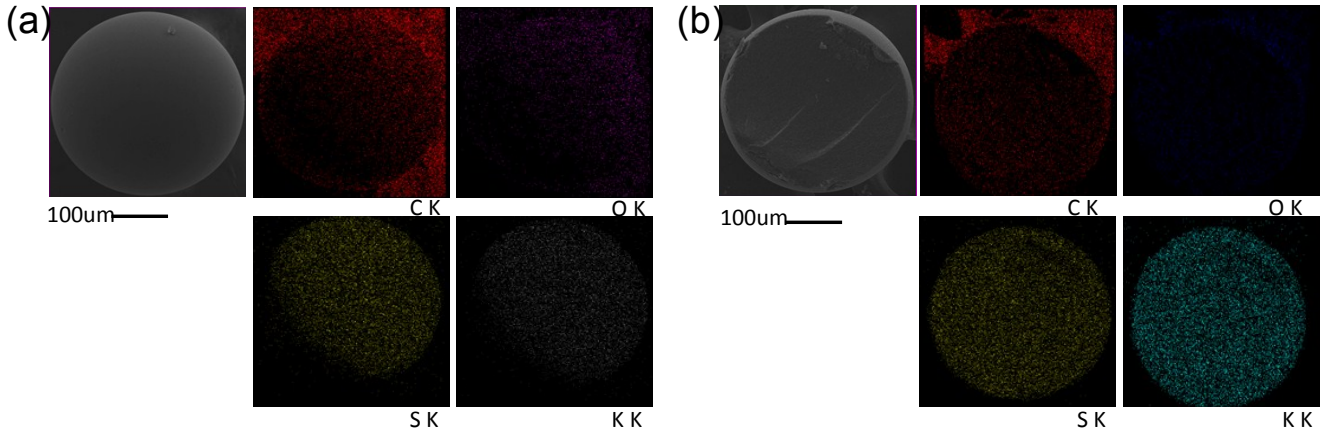


Fig. S1. EDS mapping of the distribution of the elements in MSC-0.3 (0.3 M KCl exchanged) resin beads**:** (a) general view and (b) cross-section view.

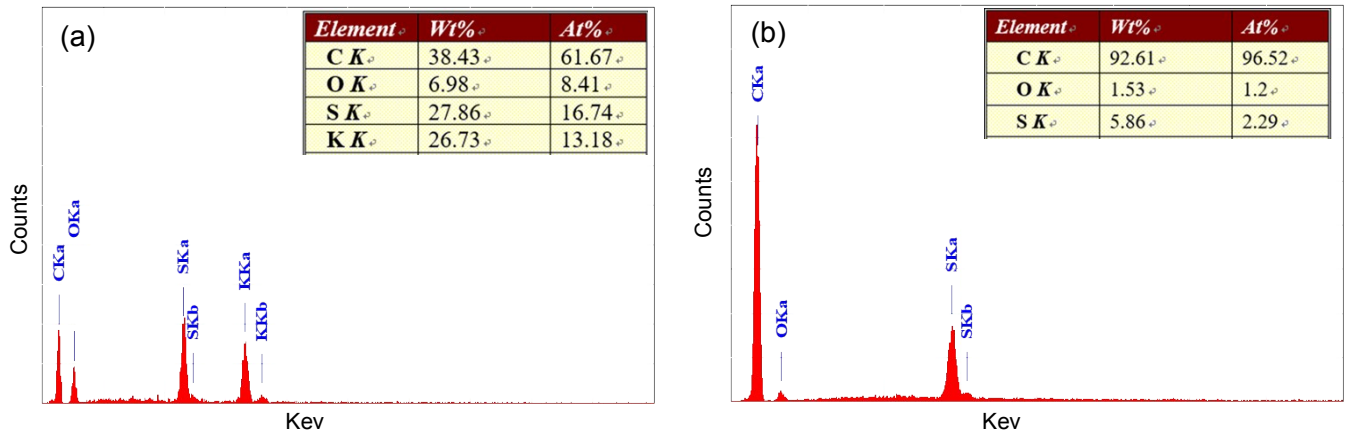


Fig. S2. EDS spectra of (a) K^+-exchanged resin beads and (b) the corresponding MSC-0.3-900 activated carbon bead. Inset: elements content.

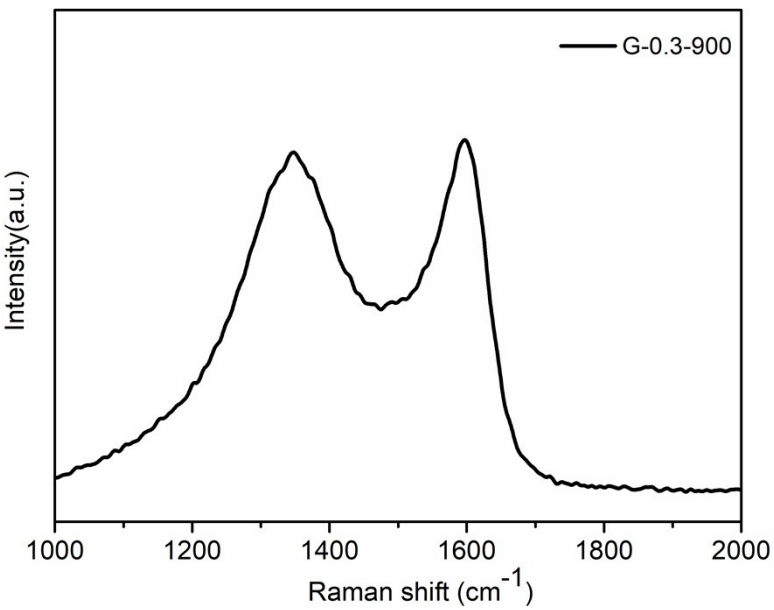


Fig. S3. Raman spectrum of GCB-0.3-900 activated carbon beads.

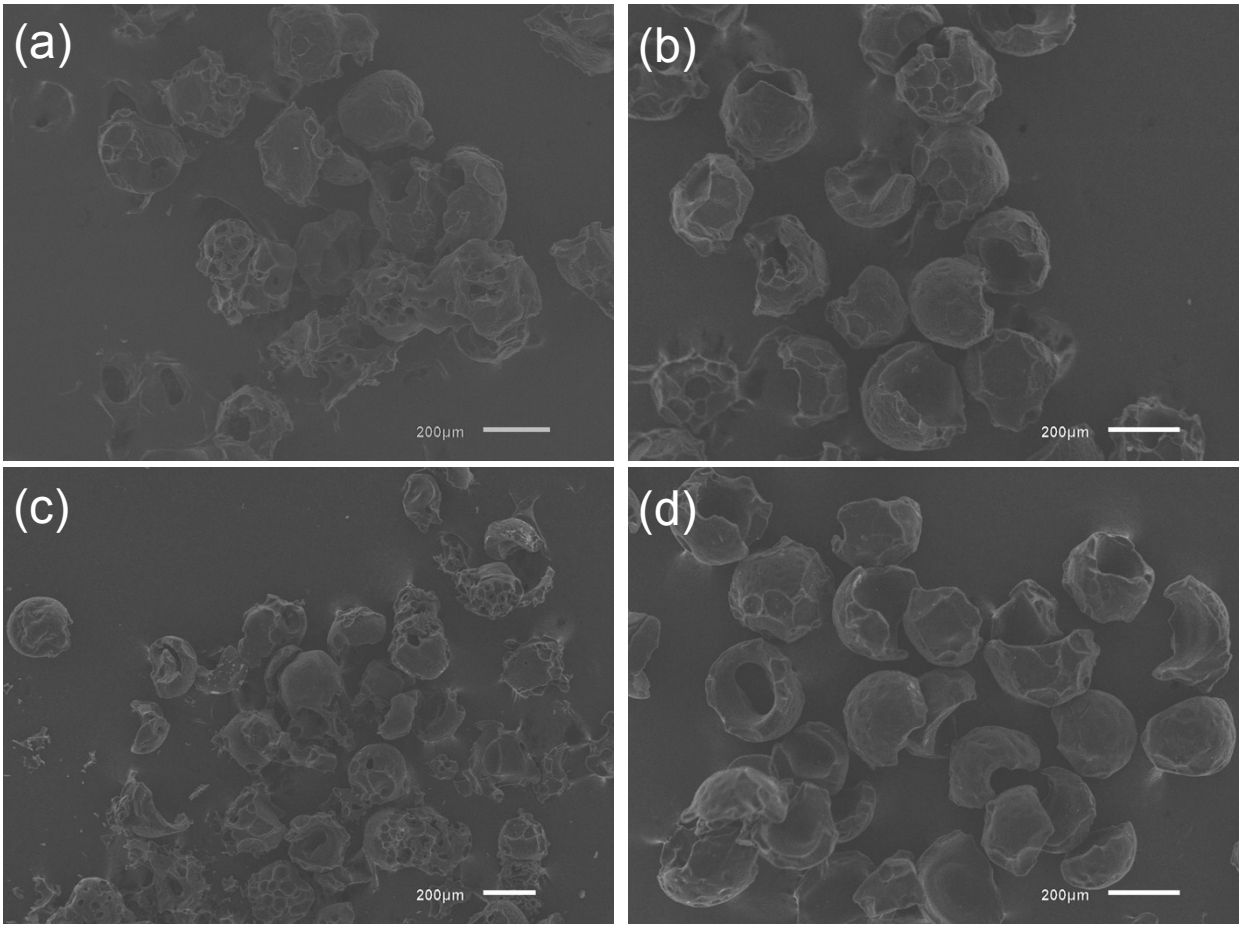


Fig. S4. SEM micrographs of (a) GCB-0.1-700, (b) GCB-0.1-800, (d) GCB-0.1-900 and (e) GCB-0.1-1000 activated carbon beads.

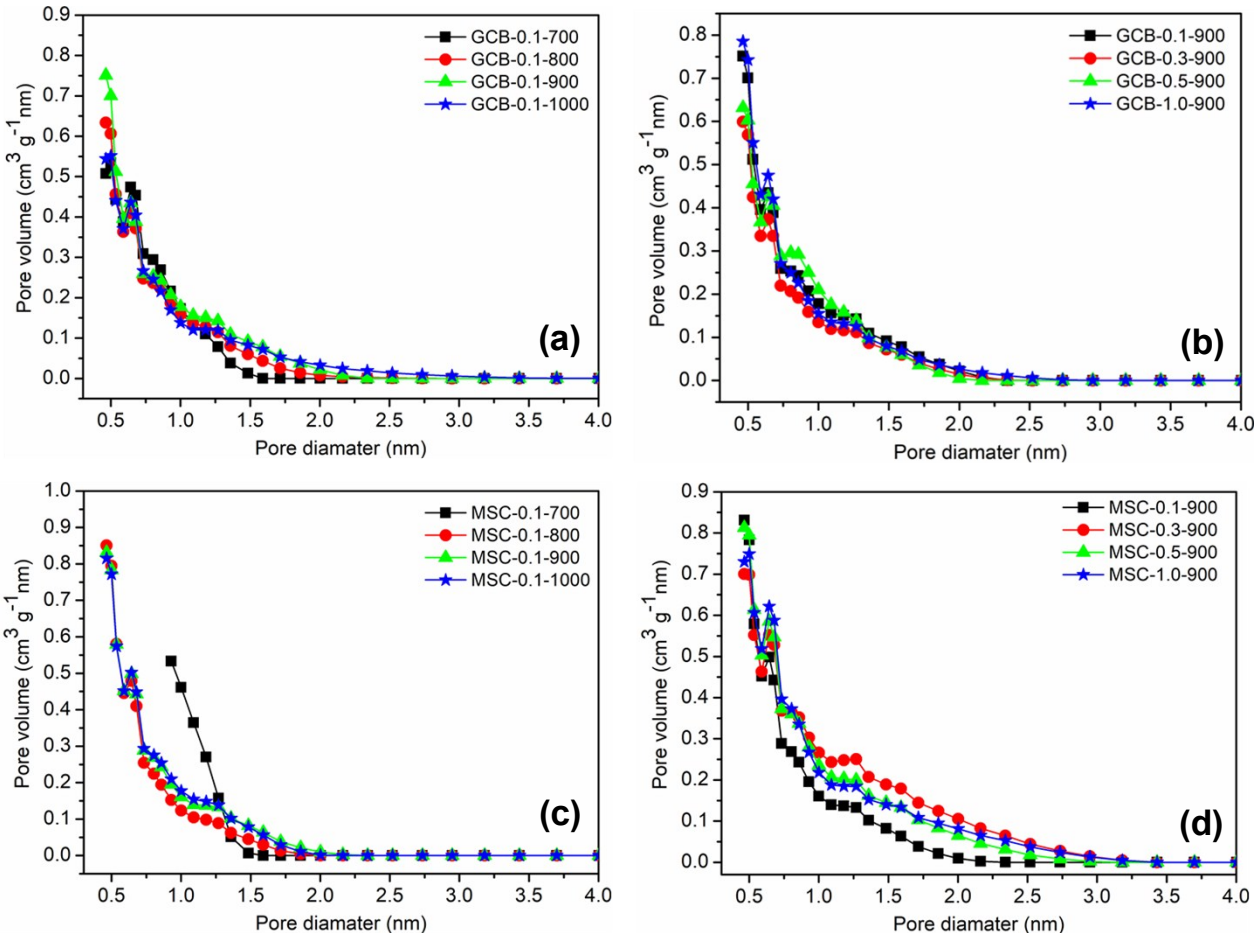


Fig. S5. DFT pore size distributions in activated carbon obtained from GCB at different carbonization temperature (a), after an exchange with KCl solution of different concentration and carbonization at 900°C (b); and from MSC at different carbonization temperature (c), after an exchange with KCl solution of different concentration and carbonization at 900°C (d).

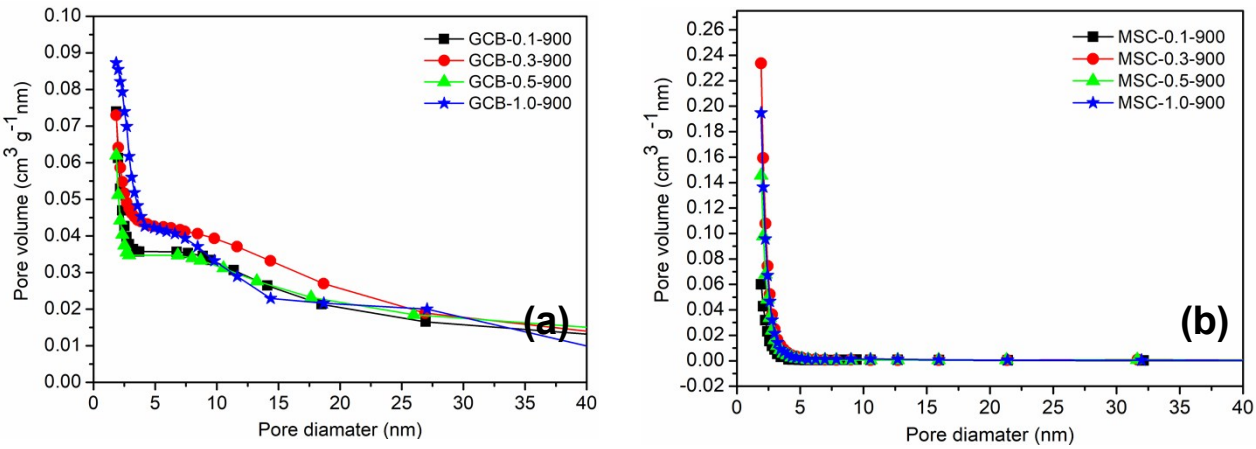


Fig. S6. BJH pore size distributions in the carbon beads obtained from GCB (a) and MSC (b) precursors ion exchange resin.

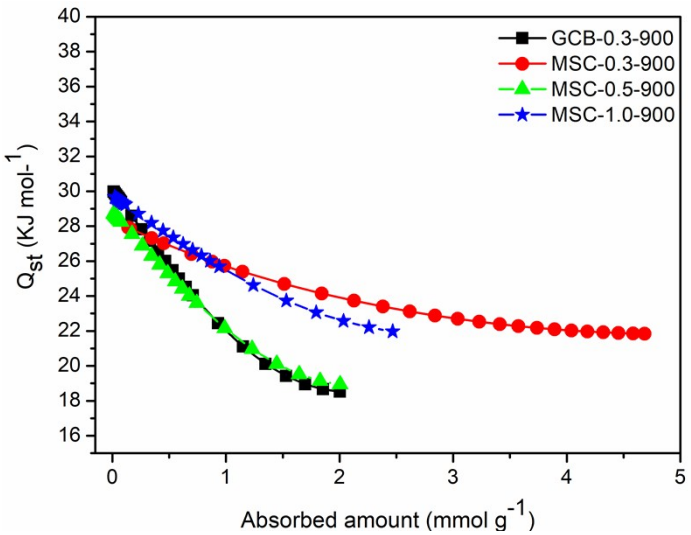


Fig. S7. Isosteric heat of CO_2 adsorption on GCB-0.3-900, MSC-0.3-900, MSC-0.5-900, and MSC-1.0-900 calculated from the experimental adsorption isotherms at 273 K and 298 K.

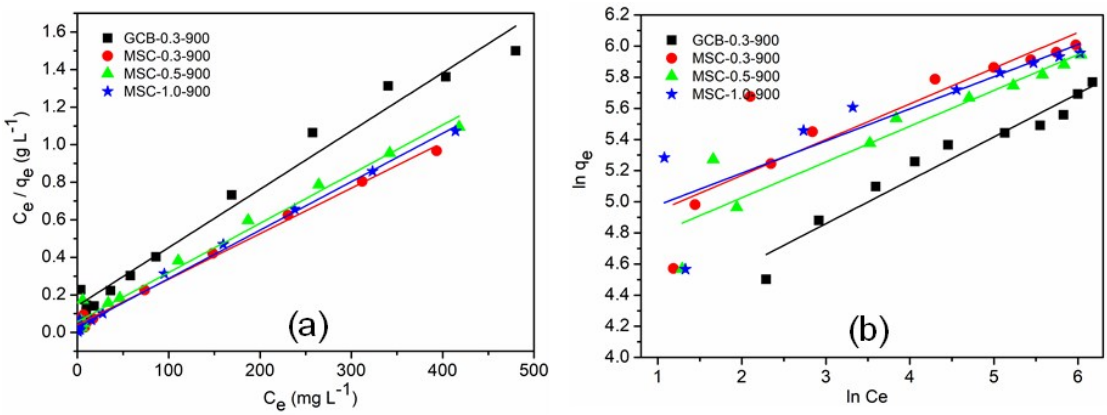


Fig. S8. Analyses on the OTC adsorption isotherms by Langmuir (a) and Freundlich (b) models (adsorption time: 12 h, adsorption temperature: 25 °C; C_0 = 20−800 mg L^{-1}; Dose of adsorbents: 1 g L^{-1}).