**Author contributions**

E.C. and R.N. synthesized materials, conducted studies, performed analyses, and co-wrote the manuscript; C.L. conducted quantification of 14NH4+ and 15NH4+ by 1H NMR; W.Z. conducted SEM characterization; F.A. conducted TEM characterization; P.K.J. conceived project, designed studies, provided analyses and models, and co-wrote the manuscript.