This journal is © The Royal Society of Chemistry 2014

Supporting Information

α-Radiolysis of ionic liquid irradiated with helium ion beam and the influence of radiolytic products on Dy^{3+} extraction

Yinyong Ao [a], Hanyang Zhou [a], Weijin Yuan [c], Shuojue Wang [a], Jing Peng [a], Maolin Zhai [a*], Jianyong Wang [b], Ziqiang Zhao [b*], Long Zhao [c] and Yuezhou Wei [c]

[a] Beijing National Laboratory for Molecular Sciences (BNLMS), Department of Applied Chemistry, College of Chemistry and Molecular Engineering, Peking University, Beijing 100871, P. R. China

[b] State Key Laboratory of Nuclear Physics and Technology, School of Physics, Peking University, Beijing 100871, P. R. China

[c] Nuclear Chemical Engineering Laboratory, School of Nuclear Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, P. R. China

* Corresponding authors: Tel/Fax: 86-10-62753794, E-mail: mlzhai@pku.edu.cn; zqzhao@pku.edu.cn

Page No.	Contents
S – 2	Fig. S1 The relationship between the energy of ions source and the penetrated depth of He^+ beams in titanium foil.
S – 3	Fig. S2 UV–Vis spectra of $[C_4mim][NTf_2]$ before (a) and after irradiation of He^+ beam (b), γ-rays (c).
S – 4	Fig. S3 ^1H NMR spectra of $[C_4mim][NTf_2]$ before (a) and after irradiation at 100 kGy by He^+ beam (b).
S – 5	Fig. S4 Micro-FTIR spectra of unirradiated and irradiated $[C_4mim][NTf_2]$.
S – 6	Fig. S5 ^{19}F NMR spectra of unirradiated and irradiated $[C_4mim][NTf_2]$.
S – 7	Fig. S6 Influence of time on Dy^{III} extraction from aqueous solution by unirradiated $[C_4mim][NTf_2]$ in combination with CA-BTP.
S – 8	Fig. S7 Influence of dose on Dy^{III} extraction from aqueous solution by γ- irradiated $[C_4mim][NTf_2]$ in combination with CA-BTP.

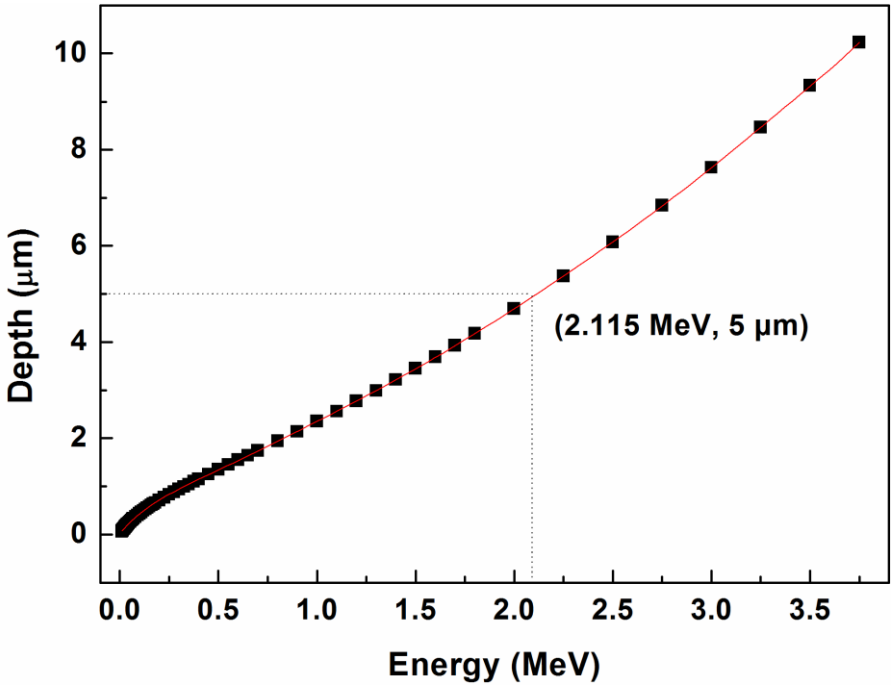

Fig. S1 The relationship between the energy of ions source and the penetrated depth of He^+ beams in titanium foil.

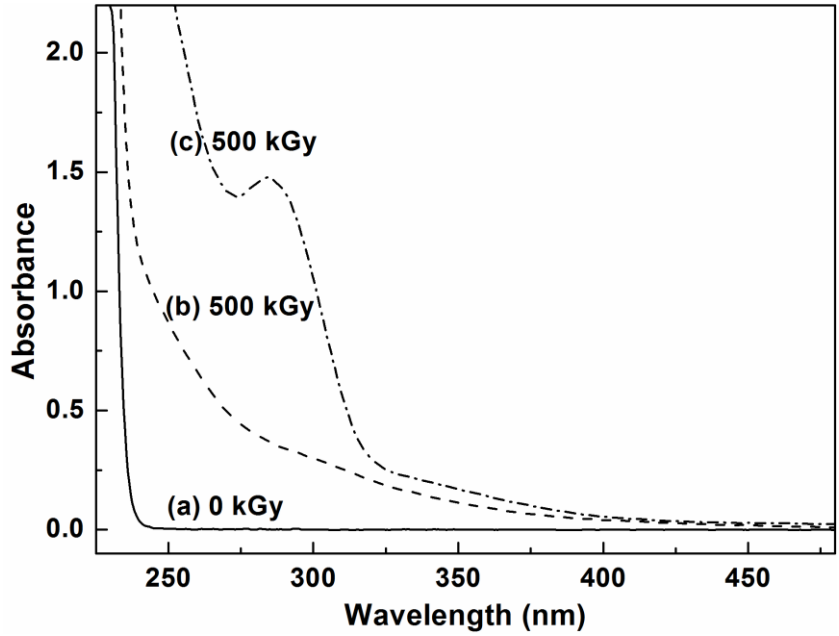

Fig. S2 UV–Vis spectra of $[C_4mim][NTf_2]$ before (a) and after irradiation of He^+ beam (b), γ-rays (c).

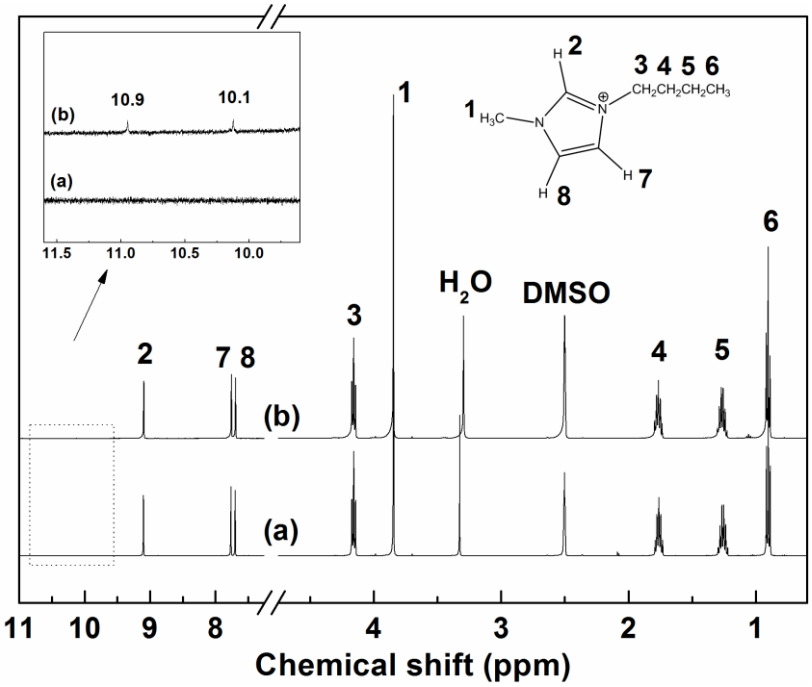

Fig. S3 ^{1}H NMR spectra of [C_4mim][NTf_2] before (a) and after irradiation at 100 kGy by He^+ beam (b).

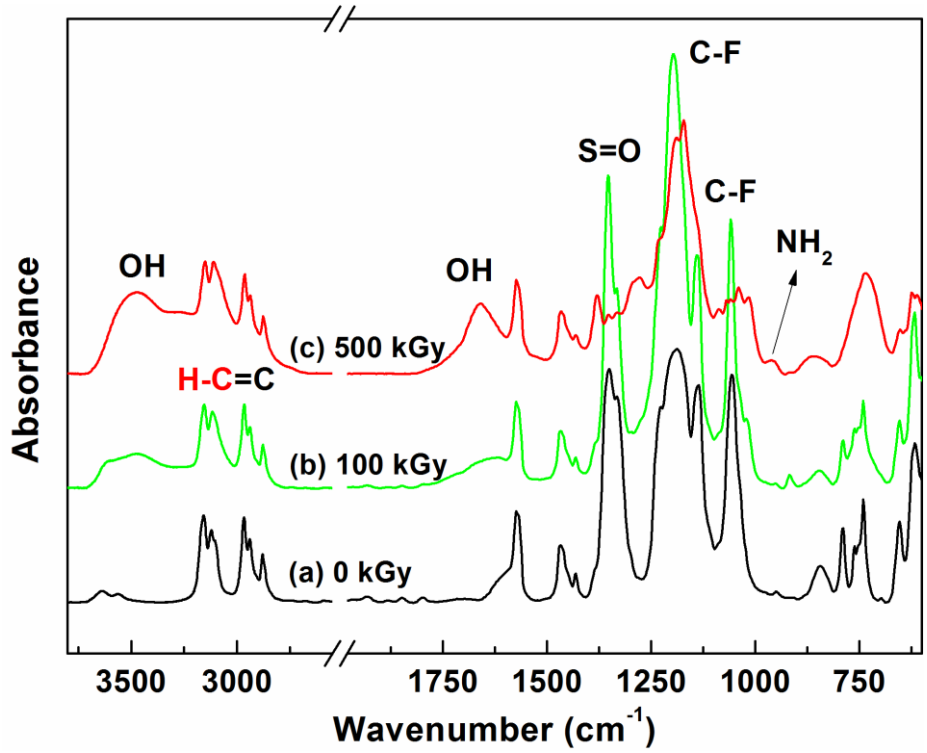

Fig. S4 Micro-FTIR spectra of unirradiated and irradiated $[C_4mim][NTf_2]$ (The aqueous phase from the washing of unirradiated sample (a) and He^+ irradiated sample (b. 100 kGy; c. 500 kGy)).

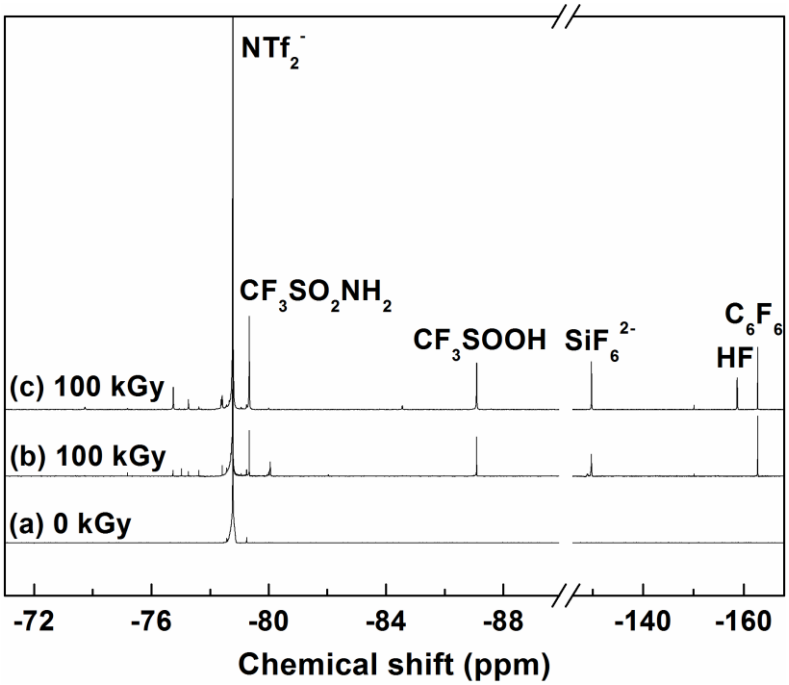

Fig. S5 ^{19}F NMR spectra of unirradiated and irradiated [C_4mim][NTf_2] (The aqueous phase from the washing of unirradiated sample (a), He^+ irradiated sample (b) and γ-irradiated sample (c)).

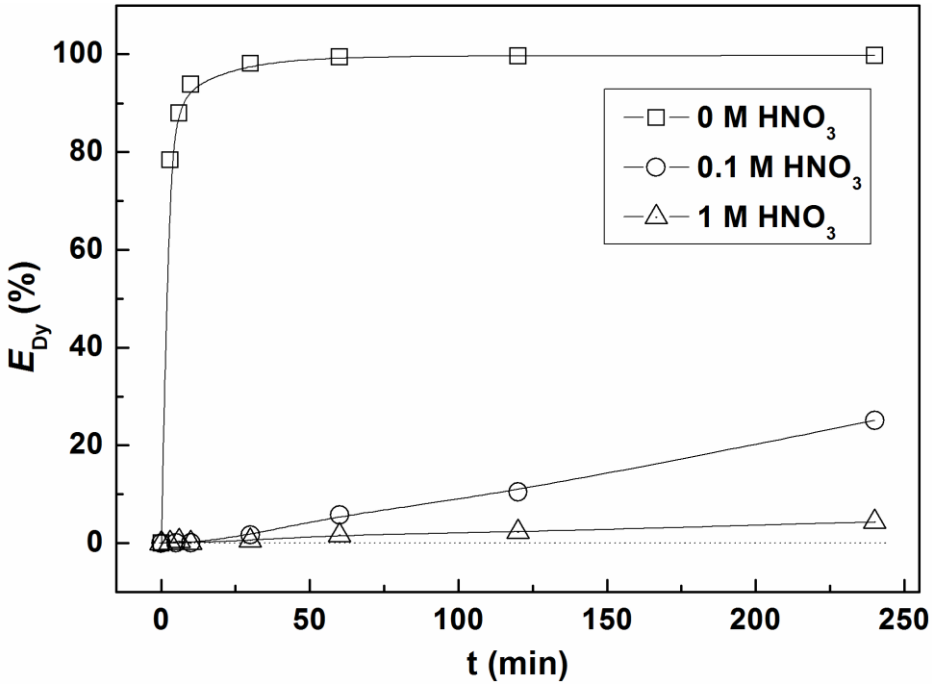

Fig. S6 Influence of time on Dy^{III} extraction from aqueous solution by unirradiated $[C_4mim][NTf_2]$ in combination with CA-BTP. Initial nitric acid concentration: 0 M (□), 0.1 M HNO_3 (O), 1 M HNO_3 (△).

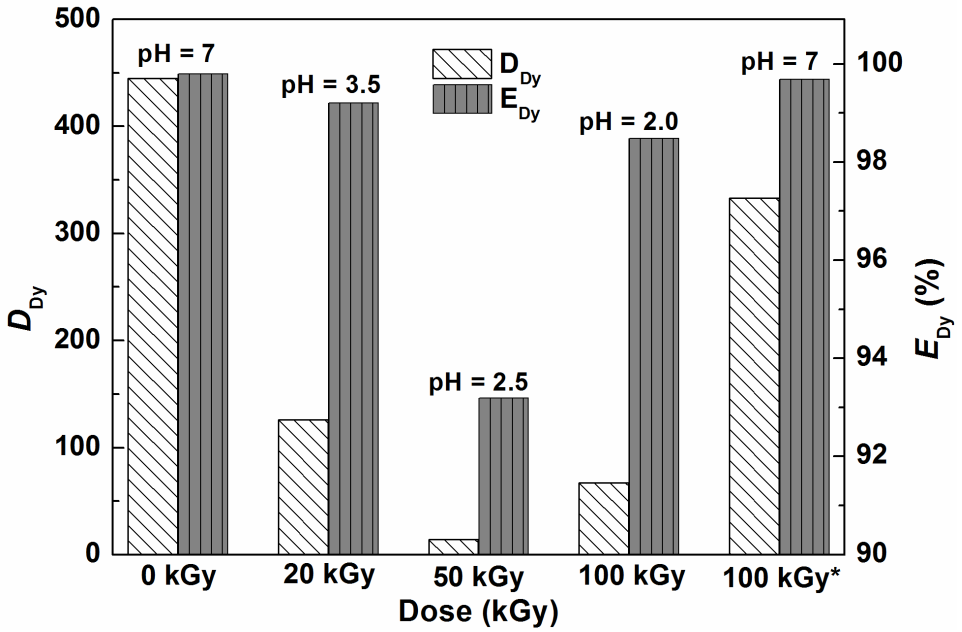

Fig. S7 Influence of dose on Dy^{III} extraction from aqueous solution by γ-irradiated $[C_4mim][NTf_2]$ in combination with CA-BTP.*The irradiated sample was washed by water for 4 times before extraction experiment. The pH of the aqueous phases after extraction was provided.