

Dr. BES René

Ph.D. in material physics

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Leading projects towards a better understanding of actinides' electronic and local structure through experiments with direct application to nuclear fuel. Aiming to increase the usage XAS/XES in Finland by developing its teaching and its application at laboratory.

Education and degree completed

- **Ph.D., material physics.** Graduated in 2010 at the University of Lyon, France.
- **M.Sc., sub-atomic Physics.** Graduated in 2007 at the University of Lyon, France.
- **B.Sc., Physics.** Graduated in 2005 at University of Montpellier II, France.

Current and previous research positions

- **University researcher** from 09/2019 to 08/2022. Accelerator laboratory, Department of physics, University of Helsinki. ⇒ *Design and development of innovative laboratory scale XAS/XES devices, including their coupling to ion beam accelerator for in situ material irradiation studies. Management of the Center for X-ray Spectroscopy and service to users.*
- **Post-doctoral fellow** from 03/2015 to 08/2019. Antimatter and nuclear engineering, Department of applied physics, Aalto University, Finland. ⇒ *Nuclear fuel characterisation using XAS and positron annihilation spectroscopy (PAS). Design and development of innovative devices dedicated to radioactive material studies.*
- **Post-doctoral fellow / Beamline scientist** from 01/2013 to 01/2015. Nuclear fuel behaviour laboratory (LLCC), CEA Cadarache, France. Detached to MARS beamline, SOLEIL synchrotron radiation facility, France. ⇒ *Development and qualification of the X-ray emission spectrometer for nuclear fuel characterization. Local contact for XAS experiments on nuclear fuel materials.*
- **Post-doctoral fellow** from 11/2010 to 01/2013. Materials under extreme conditions laboratory (CEMHTI), CNRS Orléans, France. ⇒ *He behaviour in the nuclear waste glass using ion beam analysis.*
- **Ph.D. student** from 10/2007 to 11/2010. Institute of Nuclear Physics (IPNL), University of Lyon, France. ⇒ *Xenon thermal migration on titanium nitride, inert matrix of interest in gas-cooled fast reactor*

Most recent publications

- R. Bès, G. Leinders, and K.O. Kvashnina, "Application of multi-edge HERFD-XAS to assess the uranium valence electronic structure in potassium uranate (KUO_3).", **Journal of Synchrotron radiation** 29 (2022) 21-29.
<https://doi.org/10.1107/S1600577521012431>
- R. Bès, S. Takala, and S. Huotari, "Harmonics as an alternative method for measuring I_0 during x-ray absorption spectroscopy experiments at laboratory scale", **Review of Scientific Instruments** 92 (2021) 043106.
<https://doi.org/10.1063/5.0046893>
- G. Leinders, R. Bès, K.O. Kvashnina and M. Verwerft, "Local Structure in $U(IV)$ and $U(V)$ Environments: The Case of U_3O_7 ", **Inorganic Chemistry** 59 (2020) 4576-4587.
<https://doi.org/10.1021/acs.inorgchem.9b03702>
- B. Herrero, R. Bès, F. Audubert, N. Clavier, M. Hunault and G. Baldinozzi, "Characterization of the lattice distortion of Nd-doped UO_2 through XRD and XAS on stoichiometric and hypo-stoichiometric samples. ", **Journal of Nuclear Materials** 539 (2020) 152276.
<https://doi.org/10.1016/j.jnucmat.2020.152276>
- G. Seidler, R. Bès, Ch. Schlesiger and R. Padilla Alvarez. "Report from Consultancy Meeting on Current Developments of Laboratory Based Instruments for XAS or XES", Nuclear Instrumentation, IAEA (2019).
<https://tinyurl.com/y62yd5mn>
- R. Bès, T. Ahopelto, A.-P. Honkanen, S. Huotari, G. Leinders, J. Pakarinen and K. Kvashnina, "Laboratory-scale X-ray absorption spectroscopy approach for actinide research: Experiment at the uranium L_3 -edge", **Journal of Nuclear Materials** 507 (2018) 50-53.
<https://doi.org/10.1016/j.jnucmat.2018.04.034>
- R. Bès, K. Kvashnina, A. Rossberg, G. Dottavio, L. Desgranges, Y. Pontillon, P.L. Solari, S.M. Butorin and P. Martin, "New insight in the uranium valence state determination in $U_{1-x}Nd_xO_{2\pm x}$ ", **Journal of Nuclear Materials** 507 (2018) 145-150.
<https://doi.org/10.1016/j.jnucmat.2018.04.046>
- K.O. Kvashnina, P.M. Kowalski, S.M. Butorin, G. Leinders, J. Pakarinen, R. Bès, H. Li and M. Verwerft, "Trends in valence band electronic structure of mixed uranium oxides", **Chemical Communications** 54 (2018) 9757-9760.
<https://doi.org/10.1039/C8CC05464A>