



## DUBBLE – EXPERIMENT REPORT

We kindly request you to answer the questions (max 2 pages) and return the form to NWO **within 2 months of the completion of the experiment** to [dubble@nwo.nl](mailto:dubble@nwo.nl)

<b>Beam time number:</b> 26-01-1149	<b>File number:</b>	
<b>Beamline:</b> Dubble	<b>Date(s) of experiment:</b> 6-8 June 2018	<b>Date of report:</b> 04 Feb 2020
<b>Shifts:</b> 6	<b>Local contact(s):</b> LONGO Alessandro	

**1. Who took part in the experiments?** (Please indicate names and affiliations)

Mahnaz Ghiasi Kabiri (Post doc)

Yohei Uemura (Post doc)

Marte van der Linden (PhD student)

Wang RuPan (PhD student)

Lieven Folkertsma (Master student)

\* Postdoctoraal researchers, PhD Students and master student Inorganic Chemistry and Catalysis, Debye Institute for Nanomaterials Science, Universiteit Utrecht (UU)

**2. Were you able to execute the planned experiments?**

YES / NO (If NO, please specify)

**3. Did you encounter experimental problems?**

YES /  NO (If YES, please specify)

**4. Was the local support adequate?**

YES / NO (If NO, please specify)

**5. Are the obtained results at this stage in line with the expected results as mentioned on the project proposal?**

YES / NO (If NO, please specify)

**6. Are you planning follow-up experiments at DUBBLE for this project?**

YES /  NO

**7. Are you planning experiments at other synchrotrons in the near future?**

YES /  NO

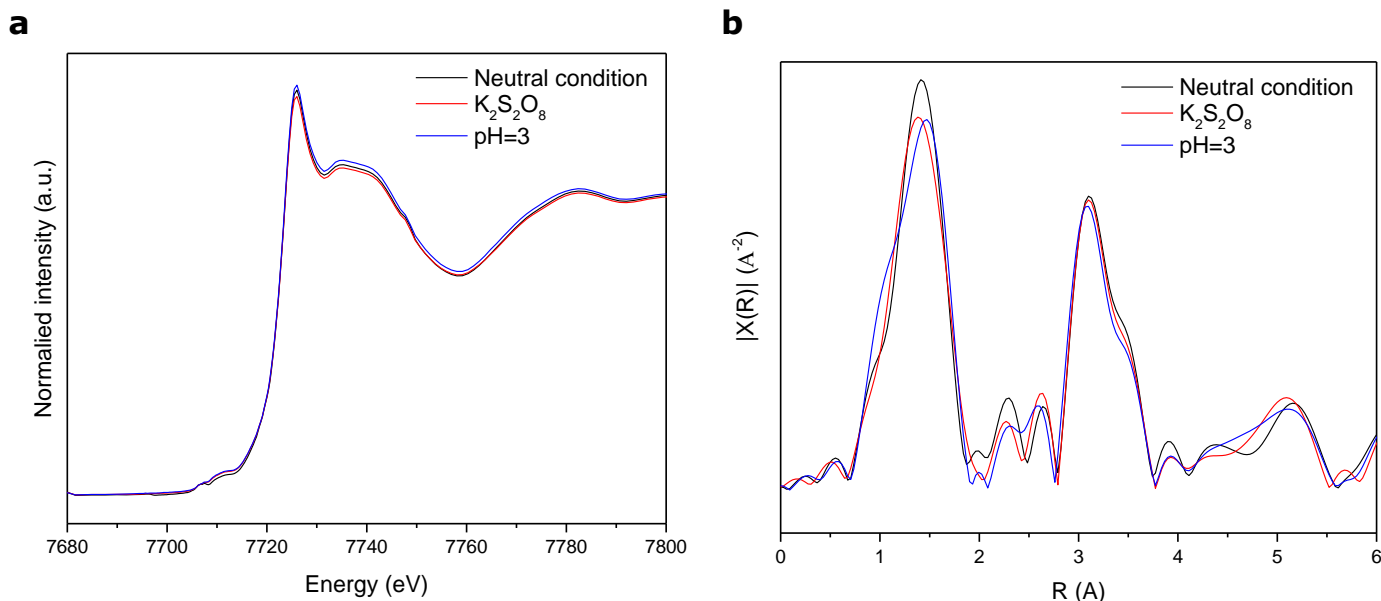
**8. Do you expect any scientific output from this experimental session (publication, patent, ..)**

**YES**/NO (If YES, please anticipate a date for submission of the envisaged publication/patent; If NO, please specify)

Based on the result we expect to published a paper. We are planning to submit the manuscript in summer 2020.

**9. Additional remarks**

The proposed experiment was intended to explore the azo dye degradation over  $\text{LaMnO}_3$ ,  $\text{LaCoO}_3$  and  $\text{LaMn}_{0.5}\text{Co}_{0.5}\text{O}_3$  nano-particles compared with  $\text{LaMnO}_3/\text{SrTiO}_3$ ,  $\text{LaCoO}_3/\text{SrTiO}_3$  and  $\text{LaMn}_{0.5}\text{Co}_{0.5}\text{O}_3/\text{SrTiO}_3$  thin film heterostructures. During this beamtime we managed to measure the complete set of experiments over nanoparticles but we did not find time to do the experiments over thin films. This was due to the fact that we preferred to have a good statistics (S/N) to be able to do EXAFS analysis. Mn and Co K-edge experiments were done for different reaction conditions: in neutral condition, in acidic condition (pH=3), and in the presence of  $\text{K}_2\text{S}_2\text{O}_8$  as electron acceptor. All measurements were done in transmission mode. From the first attempt in analyzing the data we do not see much difference in the XANES spectra of each sample under different conditions and over reaction (figure 1). But a more detailed analysis is needed. A detailed and systematic analysis of EXAFS region will help us to figure out the possible change of geometry of Mn and/or Co during the reaction. The Fourier transform  $X(R)$  spectra show small changes. We are using Athena and Artemis (on the basis of FEFF code) packages for data analysis.



**Figure 1:** Normalized cobalt K-edge XANES spectra of  $\text{LaCoO}_3$  nanoparticles under neutral condition, in acidic solution and in the presence of electron acceptor (a), and Fourier transform of the  $X(R)$  of EXAFS region (b). We obtained almost the same trend for other samples.