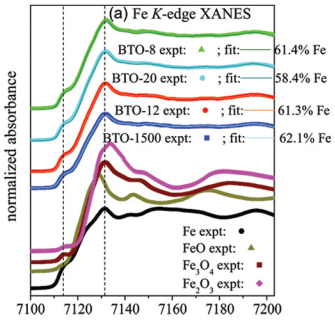
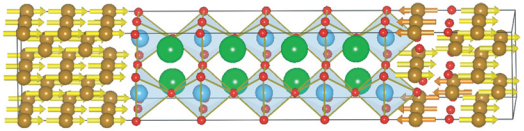
Research highlight

A structural causing magnetic properties in layer film of $BaTiO_3$ or BTO from X-ray Absorption Spectroscopy technique.



Fe K-edge XANES spectra of BTO samples

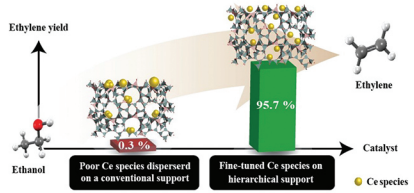


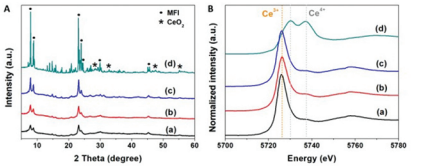
The XANES result indicate a presense of FeO phase in layer film. Ground state magnetic structure for the Fe/FeO/BTO system with two FeO layers. The yellow arrows indicate the spins up on Fe and Ti atoms, while the orange arrows insicate the spin down. Ba, Ti, O and Fe atoms are shown as green, blue, red and brown balls, respectively.

Ref: Amitesh Paul et al. Applied Physics Letters 105, 022409 (2014)

Fine-tuning the chemical state and acidity of ceria incorporated in hierarchical zeolites for ethanol dehydration.

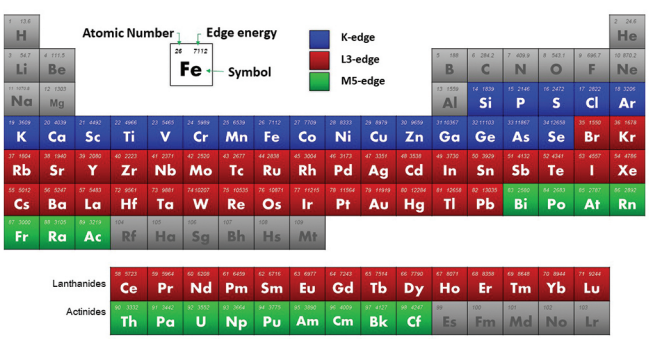
The Ce reactivity of the designed materials for ethanol dehydration is remarkably improved due to the improvement of the metal-hierarchical zeolite support interaction, acidity, and reducibility of Ce species, eventually facilitating an unprecedented yield of ethylene close to 100%. XANES spectra confirmed the chemical state of Ce species of 5Ce(Imp)-Silicalite1-HIE, 5Ce(Imp)-ZSM5-HIE, and 5Ce(Exc)-ZSM5-HIE presenting almost the high fraction of Ce^{3+} with respect to Ce^{4+}, whereas the conventional zeolite (5Ce(Exc)-ZSM5-CON) is completely fitted with Ce^{4+} characteristic





(A) XRD patterns and (B) Normalized Ce L_3 edge XANES spectra of (a) 5Ce(Exc)-ZSM5-HIE, (b) 5Ce(Imp)-ZSM5-HIE, (c) 5Ce(Imp)-Silicalite1-HIE and (d) 5Ce(Exc)-ZSM5-CON.

M. Ketkaew, S. Klinyod, K. Saenluang, C. Rodaum, A. Thivasasith, P. Kidkhunthod and C. Wattanakit, Fine-tuning the chemical state and acidity of ceria incorporated in hierarchical zeolites for ethanol dehydration. Chem. Commun., 2020, DOI: 10.1039/D0CC04886K.



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NANOTEC a member of NSTDA

BL5.2:

SUT-NANOTEC-SLRI XAS Beamline

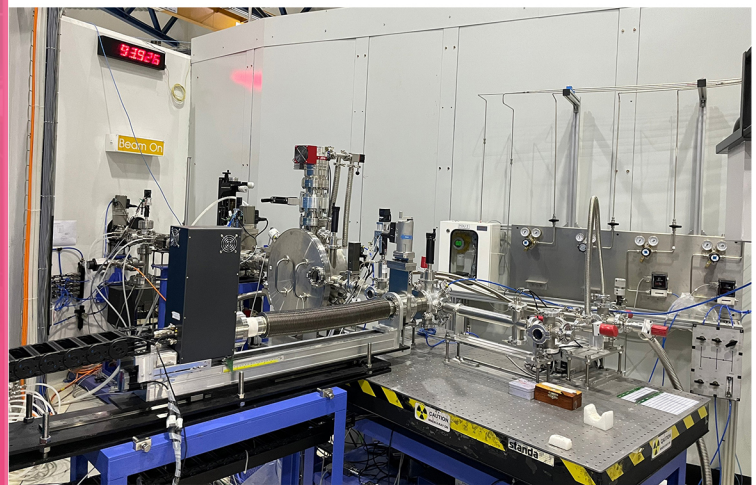
Synchrotron Light Research Institute (Public Organization)

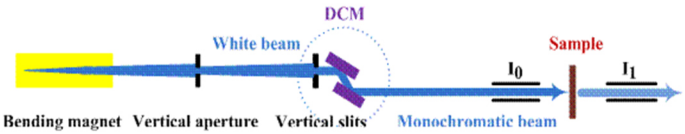
Technical specifications

- **Energy range**
  1810 – 13000 eV
- **Crystal type**
  KTP(011), InSb(111) and Ge(220)
- **Beam size at the sample**
  13 mm x 1 mm (width x height)
- **Photon flux**
  10^{8}-10^{10} photons/sec at 100 mA
- **Energy resolution**
  $2x10^{-4}$ Of the light energy (eV)
- **Experimental Setup**
  Transmission mode : Ionization chamber
  Fluorescence mode : 4-element silicon drift detector
  Total Electron Yield detection mode (TEY) : Electron collector

BL5.2: SUT-NANOTEC-SLRI XAS Beamline

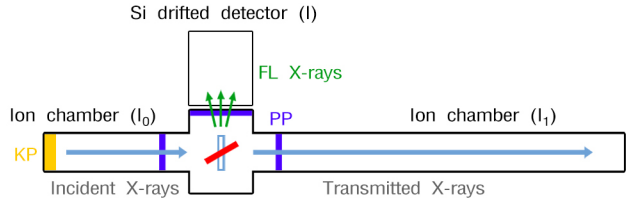
SUT-NANOTEC-SLRI XAS beamline (BL5.2) is a joint project between SUT, NANOTEC and SLRI where it is dedicated to X-ray Absorption Spectroscopy (XAS) technique. It can be used to determine chemical speciation and local structure (type of neighboring atoms, coordination number, inter-atomic distance) of the absorbing atom. Moreover, XAS is a non-destructive tool which can be carried out on any type of material, e.g. solids (crystalline or amorphous), liquids and gases. The *in-situ* experiment can be performed under non-ambient conditions (gas flow, pressure and temperature control). Consequently, this technique can be employed to study samples in different scientific areas, such as materials science, archeology, geology, biology, agricultural, environmental science, food science and medical science.





BL5.2 designed with an in-house fabricated fixed-exit double crystal monochromator (DCM). The X-ray energy is tunable by a DCM equipped with several types of crystal for covering photon energy from 1,810 eV to 13,000 eV., corresponding to the K-edge absorption of silicon to selenium, respectively. Other heavier atomic species can be investigated the absorption spectra via L or M edges.

Technical Measurement



	TM mode	FL mode	TEY Mode
Detector	Ionization chamber	4-element silicon drift detector	Electron collector
Detection	> 5 % wt	50 - 100 ppm	Conductive Sample