

Synchrotron radiation

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Since 1970s, when the first synchrotron radiation (SR) facilities became available to condensed matter researchers, they greatly influenced the progress in determining the properties of materials. As synchrotron technology matured at 3rd generation machines like ESRF (France), APS (USA) and Spring-8 (Japan), the experimental techniques became more sophisticated and easier to implement. Nowadays, there are more than 50 light sources worldwide (operational, or under construction).

Extraordinary properties of SR – broad spectrum, high brilliance, small beamsize, short pulses, high coherence, tuneable linear and circular polarization, etc. – are utilised by diversified experimental techniques to investigate the properties of matter [1,2]. The community of synchrotron radiation users, originally formed by solid state physicists and chemists, has soon extended to structural biologists and since the beginning of XXI century to (among others) archaeologists, environmental scientists, polymer chemists, biologists, art restoration experts, organic chemists and astrophysicists.

In my lecture I will present the basics of synchrotron physics, the methods of generation of the synchrotron light and the most extraordinary properties of SR. Followed by introduction to x-rays and their interaction with matter it will form a ground for understanding the principles of the most popular experimental techniques in SR laboratories, namely diffraction, resonant and non-resonant inelastic scattering, absorption, imaging, and tomography. All these techniques can also be applied to study magnetic properties of materials taking advantage of polarization-dependent absorption (dichroism) and dispersion (birefringence) [3-5].

I will present a review of selected experimental results in order to illustrate the capacity of SR in the study of magnetic properties with element, depth and site selectivity, at extreme conditions, and with nm and fs resolution. Pros and cons of SR probes with respect to other methods will be discussed. Finally, the potential for magnetic research at the emerging fourth generation SR sources (UV and X-ray free electron lasers) will be reviewed [6,7].

References

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- [3] - Beaulieu E., Scheurer F., Krill G. and Kappler J.-P. (editors) *Magnetism and Synchrotron Radiation*, Berlin; Heidelberg; New York; Barcelona; HongKong; London; Milan; Paris; Singapore; Tokyo: Springer (2001)
- [4] - Beaulieu E., Bulou H., Scheurer F., and Kappler J.-P. (editors) *Magnetism: A Synchrotron Radiation Approach*, Berlin Heidelberg: Springer (2006)
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- [7] – Jong S. de, Kukreja R., Trabant C., *et al.*, *Nature Materials* **12**, 882, (2013)

This review discusses recent advances in crucial aspects related to the catalyst such as active sites, oxygen vacancy, acid-base property, surface oxide reducibility, oxide-support interaction, and prospects of nanowires with the aim to improve the performance of the OCM process. © 2017 The Korean Society of Industrial and Engineering Chemistry. sites present on the catalysts. View. In the present study, we clarify which of the active oxygen species affect the oxidative dehydrogenation of methane by employing photocatalysts such as TiO₂ or WO₃, which generate active oxygen from UV-LED irradiation conditions under an oxygen flow. These photocatalysts were studied in combination with Sm₂O₃, which is a methane oxidation coupling catalyst. As a result the company has been forced to scrap its plans to expand overseas and instead will concentrate on growing its existing business. The continuing decline in the company's share price has led to speculation that it may fall prey to one of its rivals. This may well prove wrong), though, as Barkway's founder and chief executive, Kerry Matthews, has persuaded the board to do everything in its power to resist a takeover. C Carolyn Swaine, the former chief executive of coffee shop chain Marshmont's, is trying hard to raise capital for a bid for her old company. Swaine left last year after a series of disagreements over Marshmont's future direction, and several top managers are expected to leave if she succeeds in buying the chain. We shall illustrate the use of the various techniques from our experience with them at Corning, and then close with our own forecast for the future of forecasting. Although we believe forecasting is still an art, we think that some of the principles which we have learned through experience may be helpful to others. Manager, Forecaster & Choice of Methods. Generally, the manager and the forecaster must review a flow chart that shows the relative positions of the different elements of the distribution system, sales system, production system, or whatever is being studied. Exhibit II displays these elements for the system through which CGW's major component for color TV sets—the bulb—flows to the consumer. A disclaimer about estimates in the chart is also in order.