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In situ structure-function studies of metal catalysts

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The continuing search for more efficient processes for the manufacture of fuels, chemicals and materials is one of the more significant components in attaining a globally sustainable lifestyle. Whether it in atom-efficient syntheses, environmental protection, or transformations from alternative feedstocks, an understanding of the relationship between local structure around catalytic centres and the activity and selectivity provides the basis of catalyst design. By a combination of structure-sensitive spectroscopies (XAFS, IR, uv-visible) these centres can be probed under relevant conditions, the aim being to establish the primary reaction steps associated with a catalytic cycle. Using examples from oxide-supported metals, related to the automotive exhaust catalysts, and molecular catalysts for selective manufacture of linear alkenes, the strengths and weaknesses of in situ, steady-state, perturbed and photo-excited techniques to probe catalytic cycles will be discussed.

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Plenary session

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Talk

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