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A combined XAS and TEM study on functional cobalt oxide catalysts for water oxidation catalysis

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One of the biggest challenges of the 21st century is to develop methods of producing cheap, carbon-neutral, clean energy.(1) The Sun is a forefront renewable energy source, however current solar technologies are limited by the Sun's diurnal nature. To become a viable future technology, solar energy systems will need to efficiently convert sunlight into energy, and then provide a method of storing this harnessed energy. Photocatalytic water splitting has been considered an attractive way to store solar energy. The reaction product (molecular hydrogen) is an energy dense molecule that be used directly as a clean fuel, or be readily converted into other energy dense materials, such as solar fuels.(2) Solar fuels can be made economic through the use of inexpensive, Earth-abundant materials in the catalytic water oxidation reaction. Some of the most promising candidates for this purpose include phosphate doped metal oxides.(3) Understanding the role of the phosphate dopant in these catalysts is analytically challenging as the active dopant component is present in low levels and results in disordered amorphous materials. Our work focusses on developing a synthetic approach to systematically alter the phosphate dopant in metal oxide catalysts and developing new analytical approaches to understand how the resulting disordered structure correlates with the high catalytic function.

Keywords or phrases (comma separated)

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Summary

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