Supporting Information

Facet-dependent Photodegradation of Methylene Blue using Pristine CeO$_2$ Nanostructures

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Figure S1: XRD patterns of Ce-1, Ce-2 and Ce-3
Figure S2. TEM images of (a), (b) and (c) showing the formation of hexagonal, rectangular and cuboidal shape of CeO$_2$ nanoparticles in Ce-1, Ce-2 and Ce-3 respectively.
Figure S3: (a) and (b) Nitrogen adsorption–desorption isotherms of Ce-1 and Ce-2, containing their corresponding pore size distribution inset respectively.
Figure S4: Plausible photodegradation mechanism of methylene blue using Ce-3 as catalyst
Table S1. A comparative analysis of MB degradation efficiency of different CeO\textsubscript{2} based materials.

| Material                          | Time    | Ref   |
|----------------------------------|---------|-------|
| Pristine CeO\textsubscript{2}    | 175 min | Present work |
| CeO\textsubscript{2}/V\textsubscript{2}O\textsubscript{5} | 300 min | (46) |
| CeO\textsubscript{2}/CuO       | 300 min | (46) |
| Gd dopped CeO\textsubscript{2} | 5 h     | (19)  |
| Bare CeO\textsubscript{2} -CeZrO\textsubscript{4} | 23 h    | (19)  |
| K-CeZrO\textsubscript{4}       | 8 h     | (20)  |
| CeO\textsubscript{2}-ZnO mixed oxides | 300 min | (45)  |