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Supporting Information

Synergistic Effect of Simultaneous Doping of Ceria Nanorods with Cu and Cr on CO Oxidation and NO Reduction

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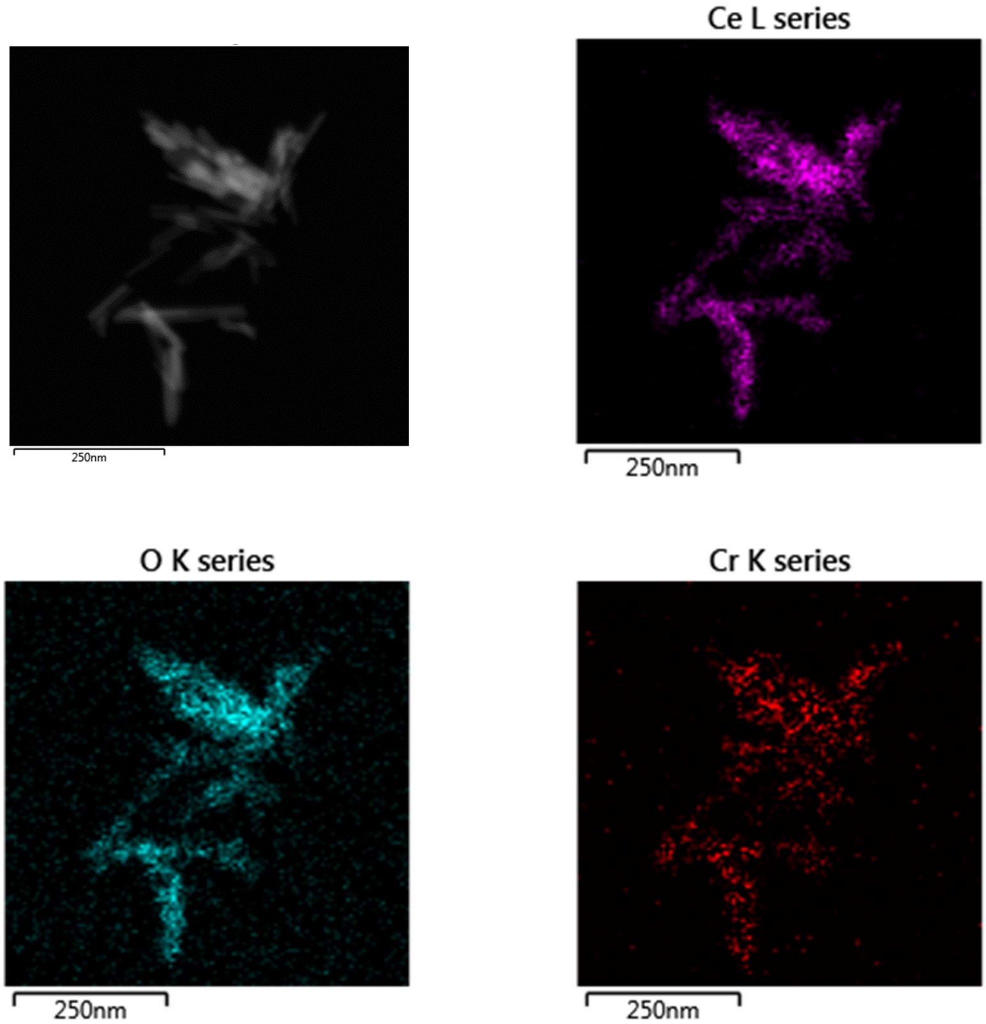

Figure S1. TEM-EDS analysis of 1%Cu-ceria nanorods.

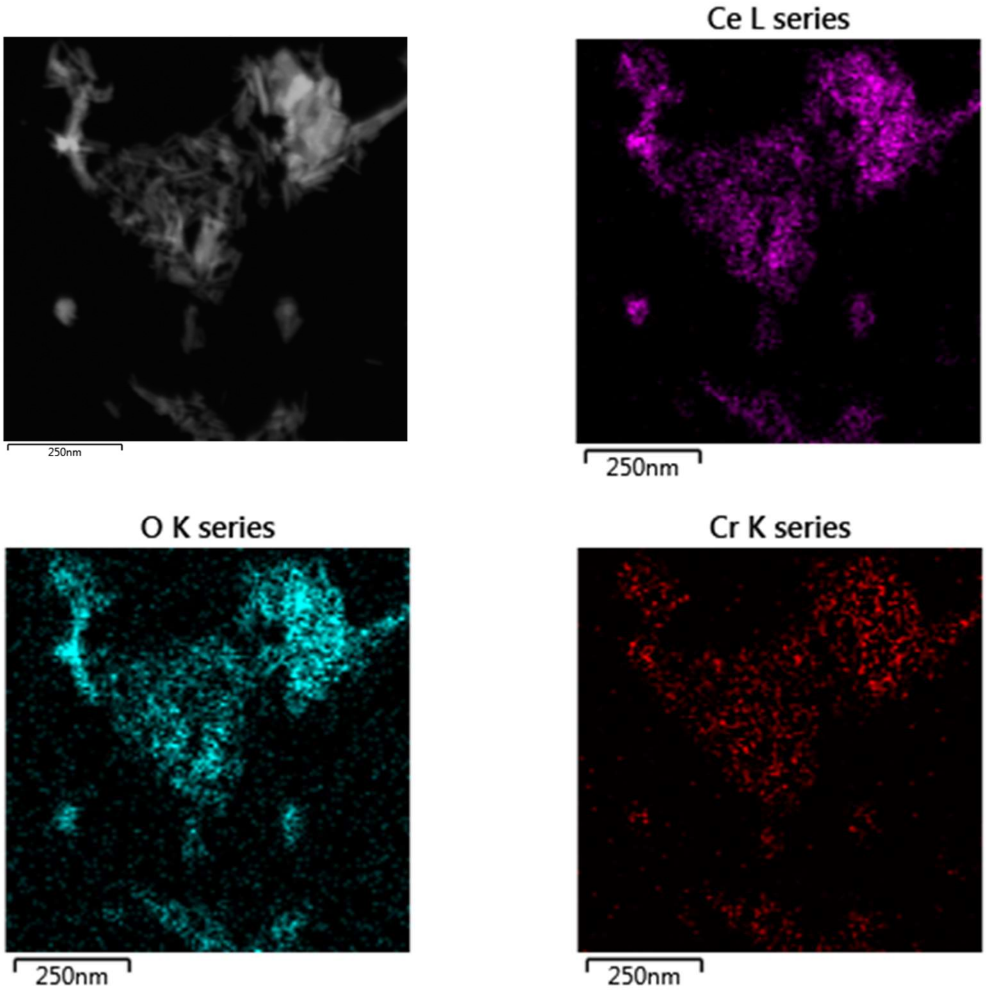

Figure S2. TEM-EDS analysis of 3%Cu-ceria nanorods.

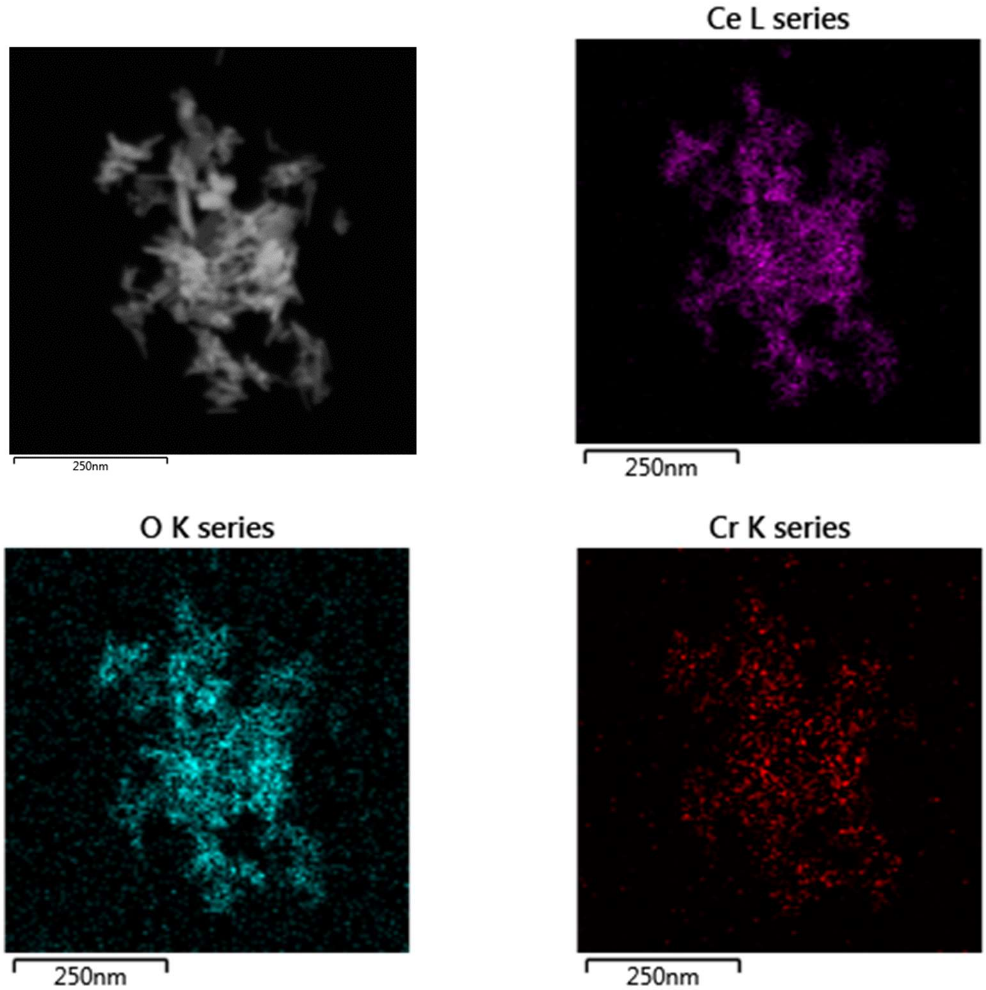

Figure S3. TEM-EDS analysis of 5%Cu-ceria nanorods.

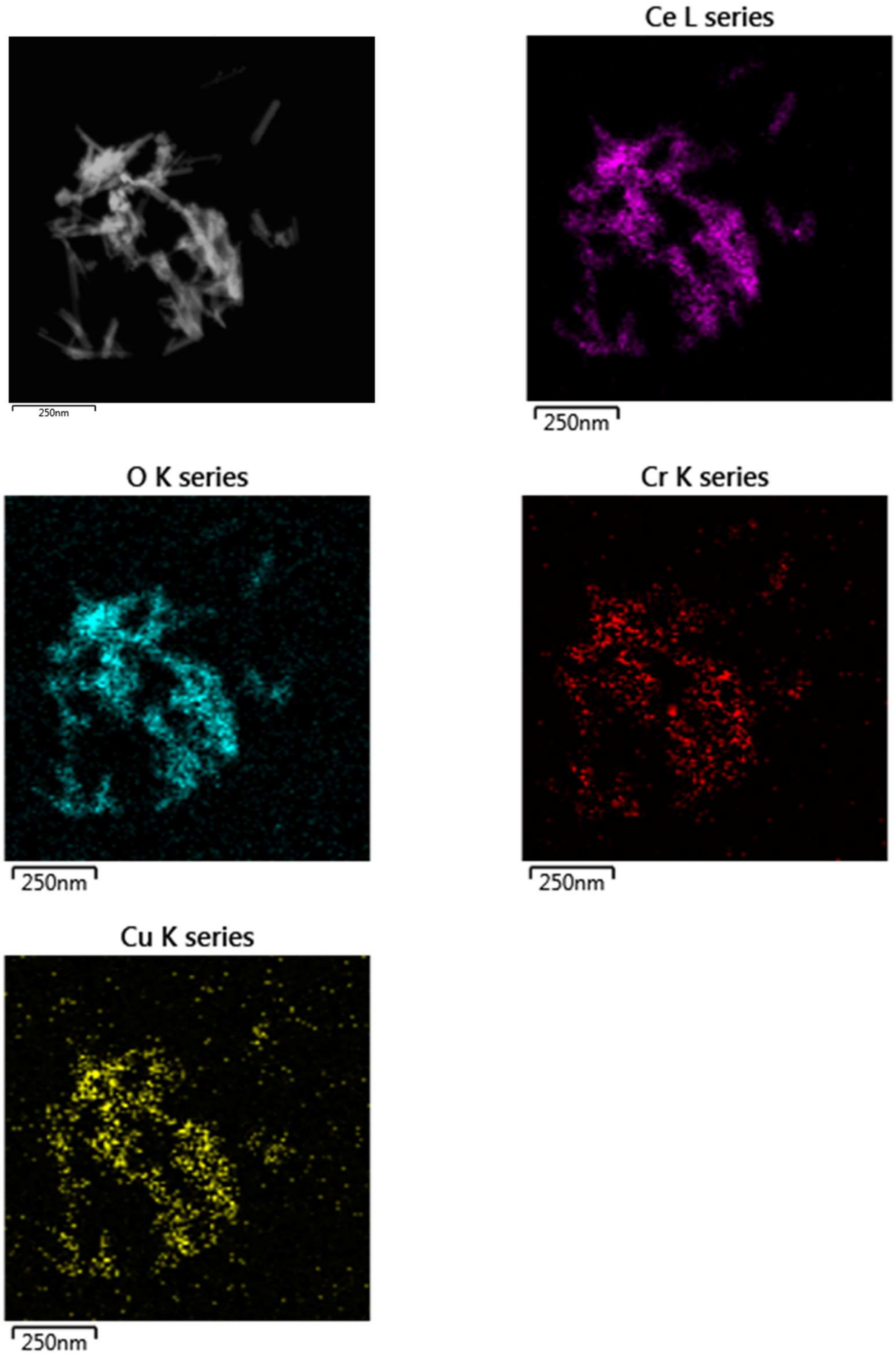

Figure S4. TEM-EDS analysis of 1%Cu/1%Cr-ceria nanorods.

Table S1. TPR peak locations and areas for undoped and doped ceria nanorods, using full Gaussian distributions as shown in Figure S1 for an example.

Peak	Centre (°C)	H_2 consumption [cm^3 (STP) H_2 g_{cat}^{-1}]
Undoped ceria nanorods		
Low temperature 1	359	7.6
Low temperature 2	467	1.9
High temperature 1	833	20.2
1 wt. % Cu		
Low temperature 1	333	1.7
Low temperature 2	421	5.0
High temperature 1	844	28.1
3 wt. % Cu		
Low temperature 1	297	0.9
Low temperature 2	367	5.6
High temperature 1	831	24.9
5 wt. % Cu		
Low temperature 1	275	1.1
Low temperature 2	338	7.4
High temperature 1	863	26.8
7 wt. % Cu		
Low temperature 1	197	2.5
Low temperature 2	222	5.0
Low temperature 3	272	7.9
High temperature 1	852	23.6
1 wt. % Cr		
Low temperature 1	303	3.2
Low temperature 2	418	6.5
High temperature 1	822	13.9
3 wt. % Cr		
Low temperature 1	295	3.9
Low temperature 2	435	10.4
High temperature 1	826	16.8
5 wt. % Cr		
Low temperature 1	304	2.4
Low temperature 2	414	8.7
High temperature 1	822	14.6
1 wt. % each Cu and Cr		
Low temperature 1	192	3.5
Low temperature 2	313	1.3
Low temperature 3	404	7.1
High temperature 1	798	11.3

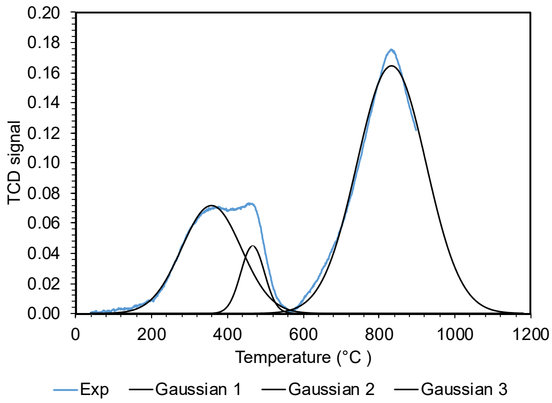

Figure S5. Deconvolution of the TPR experimental data with multiple Gaussian distributions (here for undoped CeO_2). The full area of each gaussian peak was accounted for the calculation of the hydrogen consumption in cm^3 (STP) H_2 g_{cat}^{-1}.

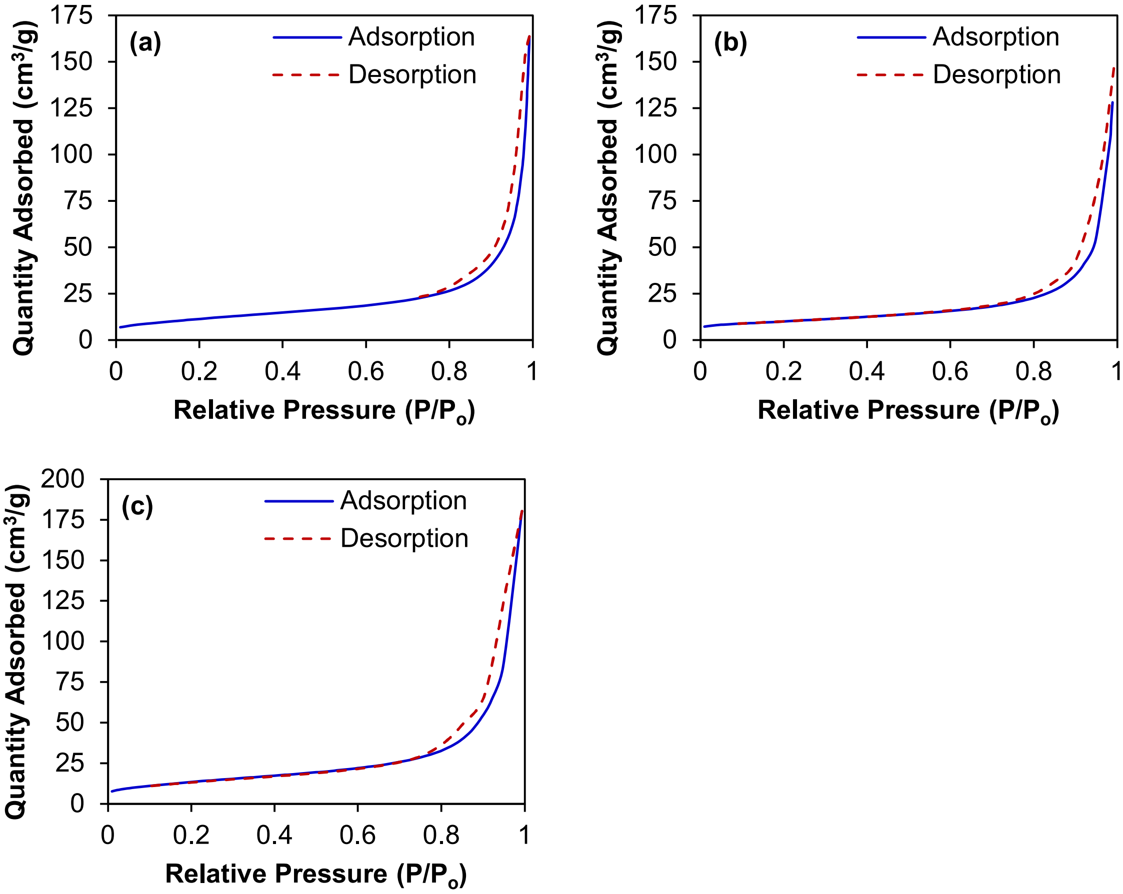

Figure S6. Nitrogen isotherms for (a) undoped ceria nanorods, (b) 1 wt. % Cu-doped ceria nanorods, and (c) 1 wt. % Cr-doped ceria nanorods.

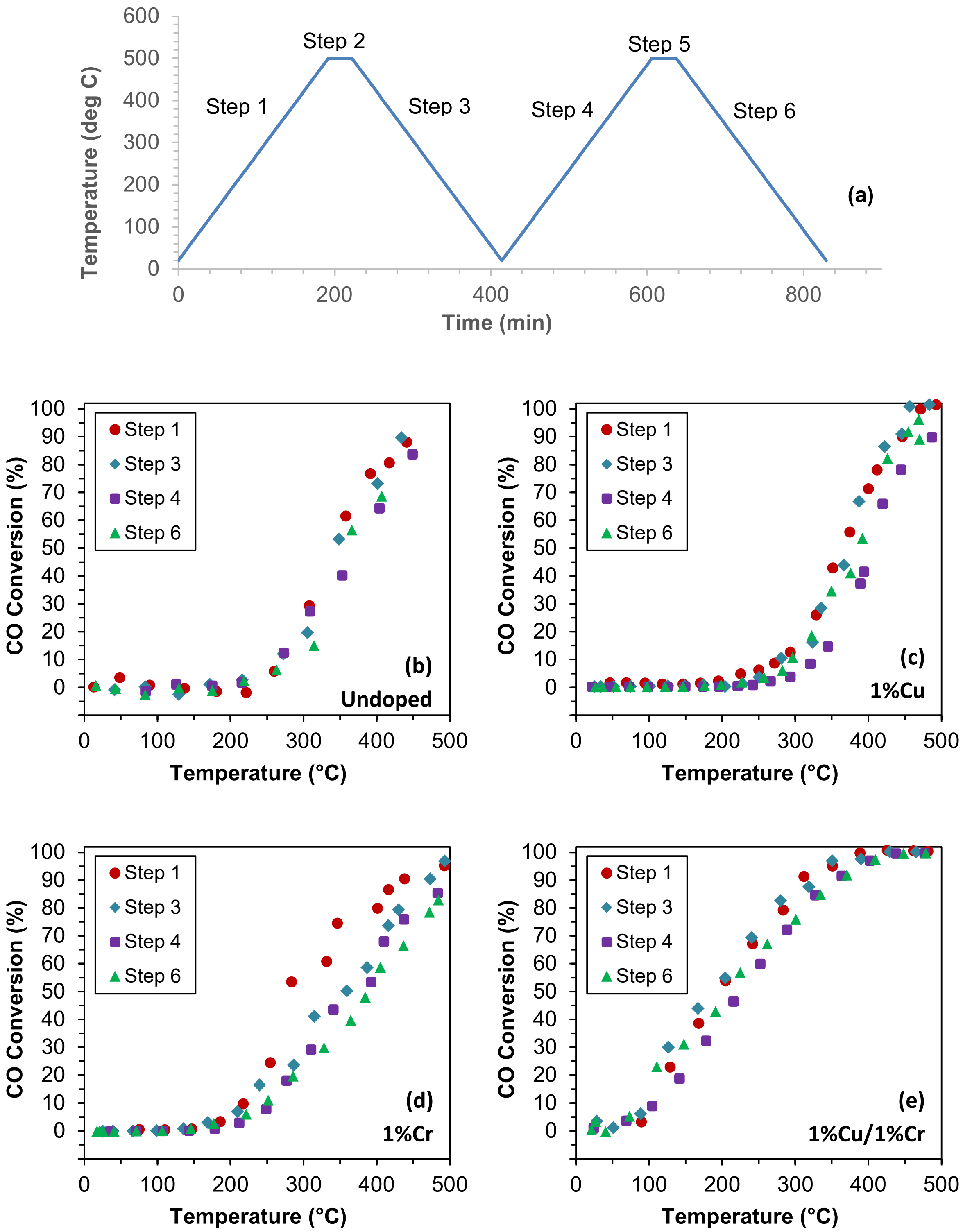

Figure S7. Repeated CO oxidation steps (a) at different temperatures for (b) undoped ceria nanorods, (c) 1 wt. % Cu-doped ceria nanorods, (d) 1 wt. % Cr-doped ceria nanorods, and (e) 1%Cu/1%Cr-ceria.

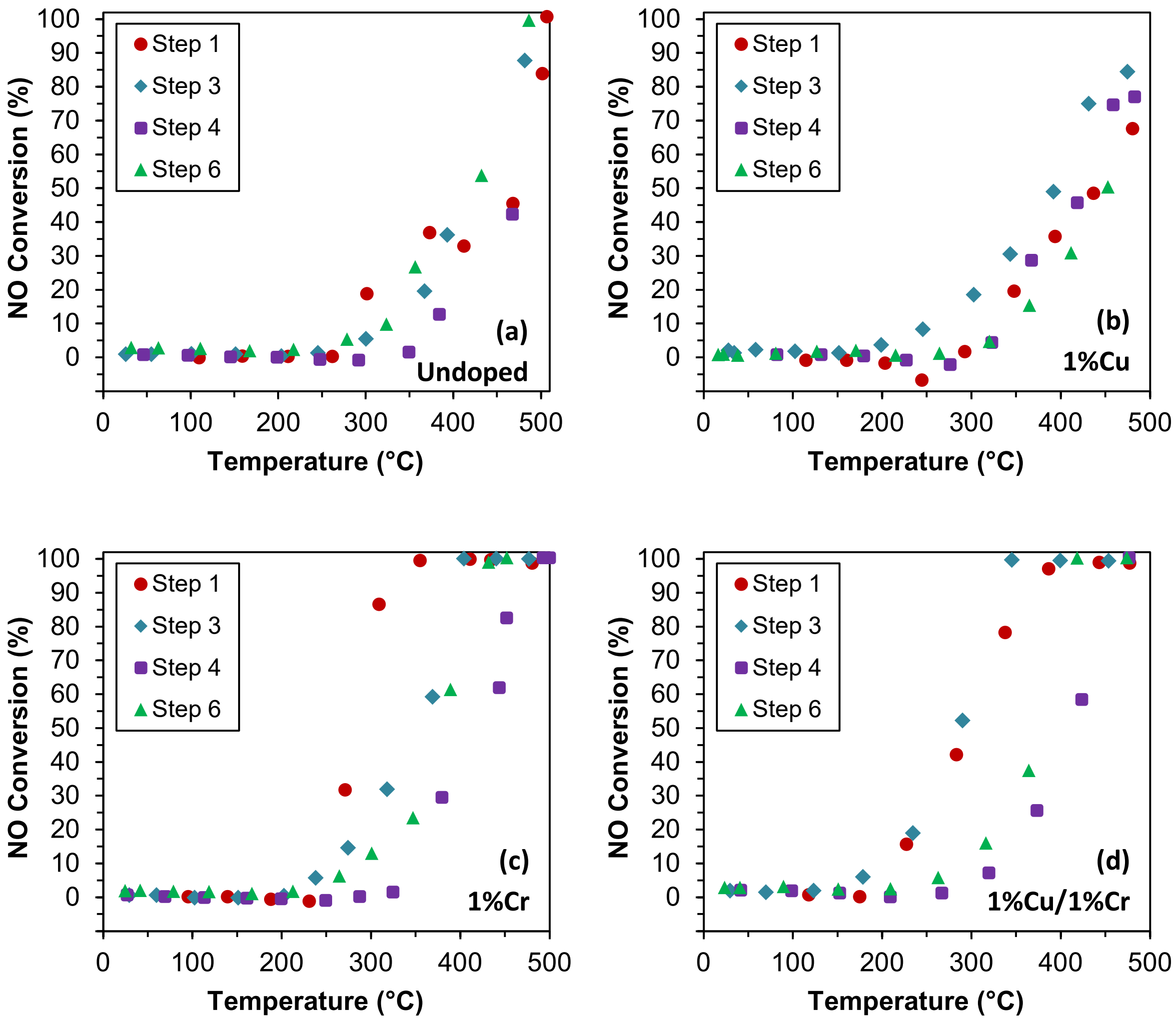

Figure S8. Repeated NO reduction steps for (a) undoped ceria nanorods, (b) 1 wt. % Cu-doped ceria nanorods, (c) 1 wt. % Cr-doped ceria nanorods, and (d) 1%Cu/1%Cr-ceria.

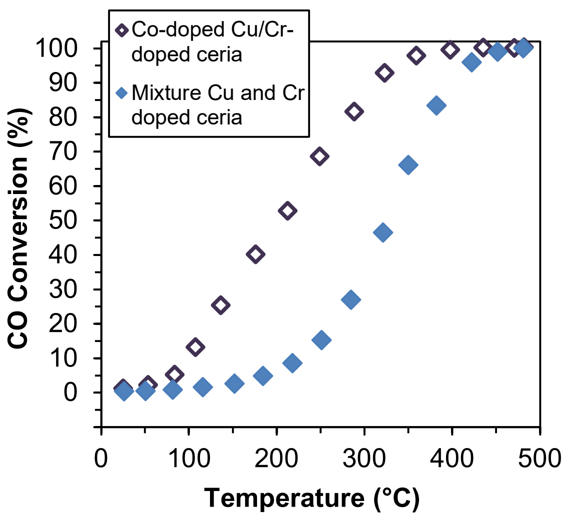

Figure S9. CO oxidation catalytic conversions for ceria nanorods co-doped with 1 wt. % each Cu and Cr (15 mg catalyst weight), compared with a physical mixture of 2 wt. % Cu-doped ceria and 2 wt. % Cr-doped ceria (7.5 mg each, to achieve equal amounts of Ce, Cr, and Cu).