

Facile synthesis of mesoporous sulfated Ce/TiO₂ nanofiber solid superacid with nanocrystalline frameworks by using collagen fiber as biotemplate and its application in esterification

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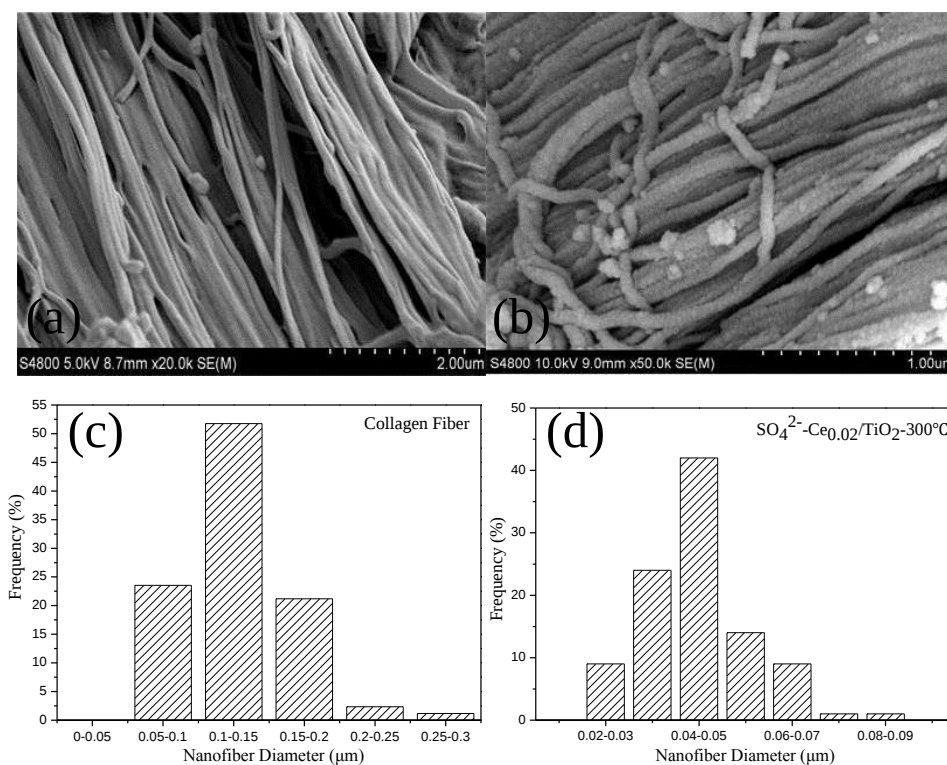
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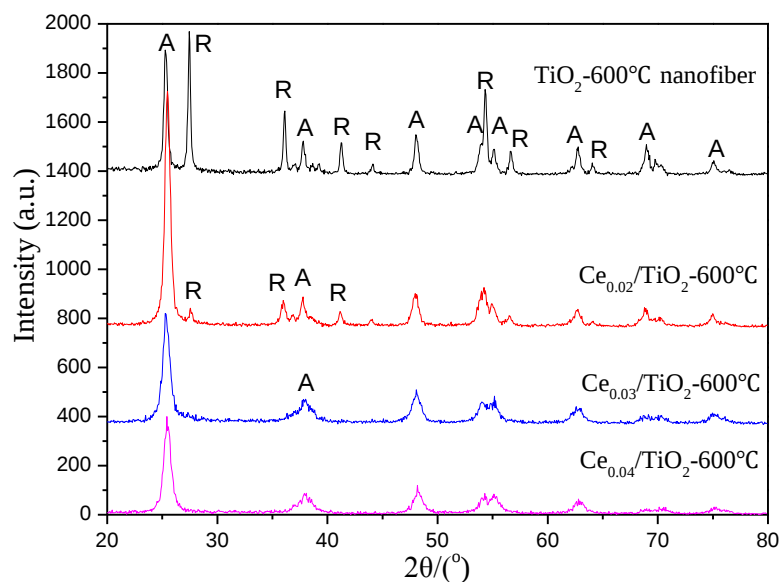
Supporting Information

Supporting Information 1:

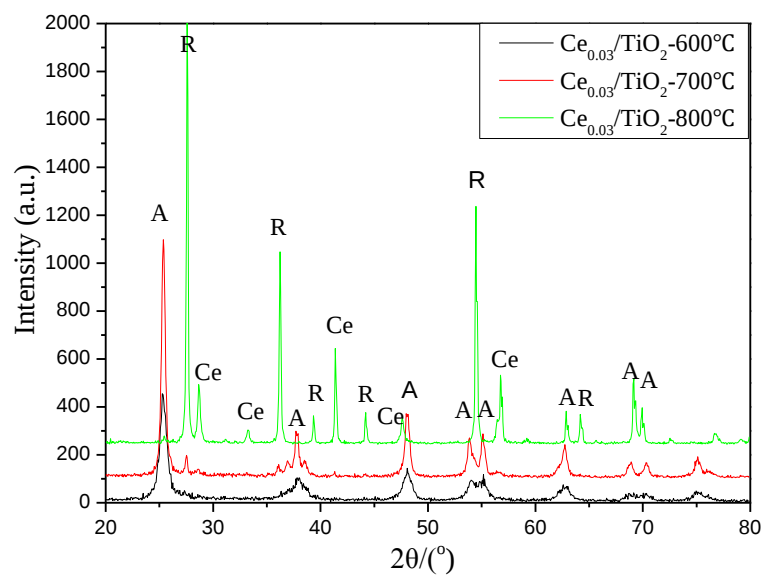


Supporting Information 1. FESEM image of collagen fiber (a), the $\text{SO}_4^{2-}\text{-Ce}_{0.02}/\text{TiO}_2\text{-300}^\circ\text{C}$ nanofiber (b), the corresponding diameter distributions of collagen fiber (c) and $\text{SO}_4^{2-}\text{-Ce}_{0.02}/\text{TiO}_2\text{-300}^\circ\text{C}$ nanofiber (d)

Supporting Information 2:

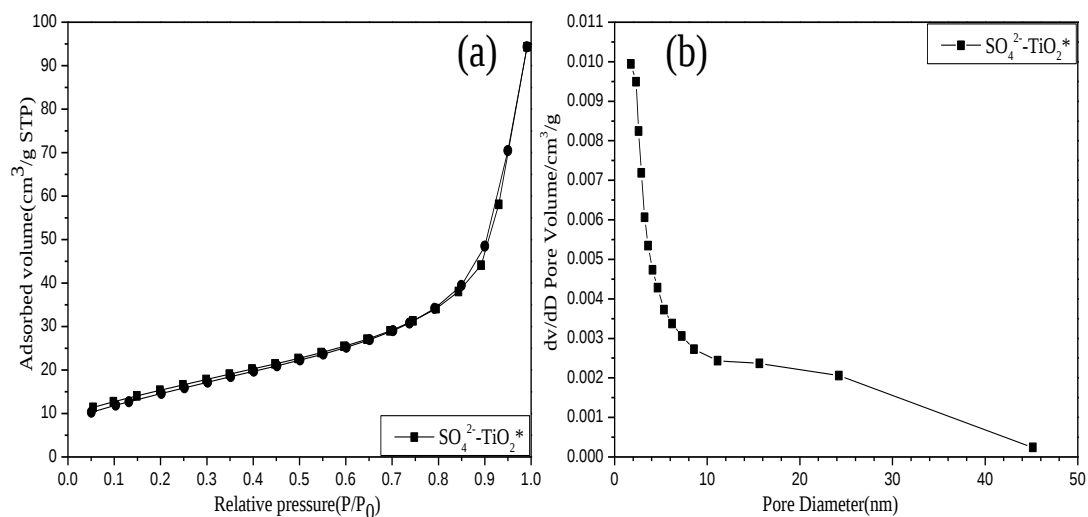


Supporting Information 2a. XRD patterns of the Ce_x/TiO_2 nanofibers (600 $^{\circ}\text{C}$)



Supporting Information 2b. XRD patterns of the $\text{Ce}_{0.03}/\text{TiO}_2$ nanofibers with different temperature treatment (600 $^{\circ}\text{C}$, 700 $^{\circ}\text{C}$, 800 $^{\circ}\text{C}$)

Supporting Information 3:



Supporting Information 3. Nitrogen adsorption/desorption isotherms and BJH pore-size distributions of $\text{SO}_4^{2-}\text{-TiO}_2^*$ prepared by the conventional method

Supporting Information 4:

Support Table 1 Peak temperatures of NH₃-TPD spectra and the corresponding amounts of acid sites of SO₄²⁻-Ce_x/TiO₂ catalysts with different Ce doping and heat treatment temperature

Sample	Peak (L)		Peak (H)	
	Peak temp.	Area	Peak temp.	Area
	(°C)	(arb. unit)	(°C)	(arb. unit)
Ce _{0.02} /TiO ₂ nanofiber	499	280	/	/
SO ₄ ²⁻ -Ce _{0.02} /TiO ₂ -100°C	595	663	775	516
SO ₄ ²⁻ -Ce _{0.02} /TiO ₂ -200°C	590	870	776	567
SO ₄ ²⁻ -Ce _{0.02} /TiO ₂ -300°C	595	983	777	636
SO ₄ ²⁻ -Ce _{0.02} /TiO ₂ -400°C	596	484	773	518
SO ₄ ²⁻ -Ce _{0.02} /TiO ₂ -500°C	/	/	772	364
SO ₄ ²⁻ -TiO ₂ nanofiber	515	380	685	235
SO ₄ ²⁻ -Ce _{0.01} /TiO ₂ -300°C	570	328	729	515
SO ₄ ²⁻ -Ce _{0.03} /TiO ₂ -300°C	595	640	782	430
SO ₄ ²⁻ -Ce _{0.04} /TiO ₂ -300°C	602	566	784	336
SO ₄ ²⁻ -Ce _{0.05} /TiO ₂ -300°C	578	567	/	/

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