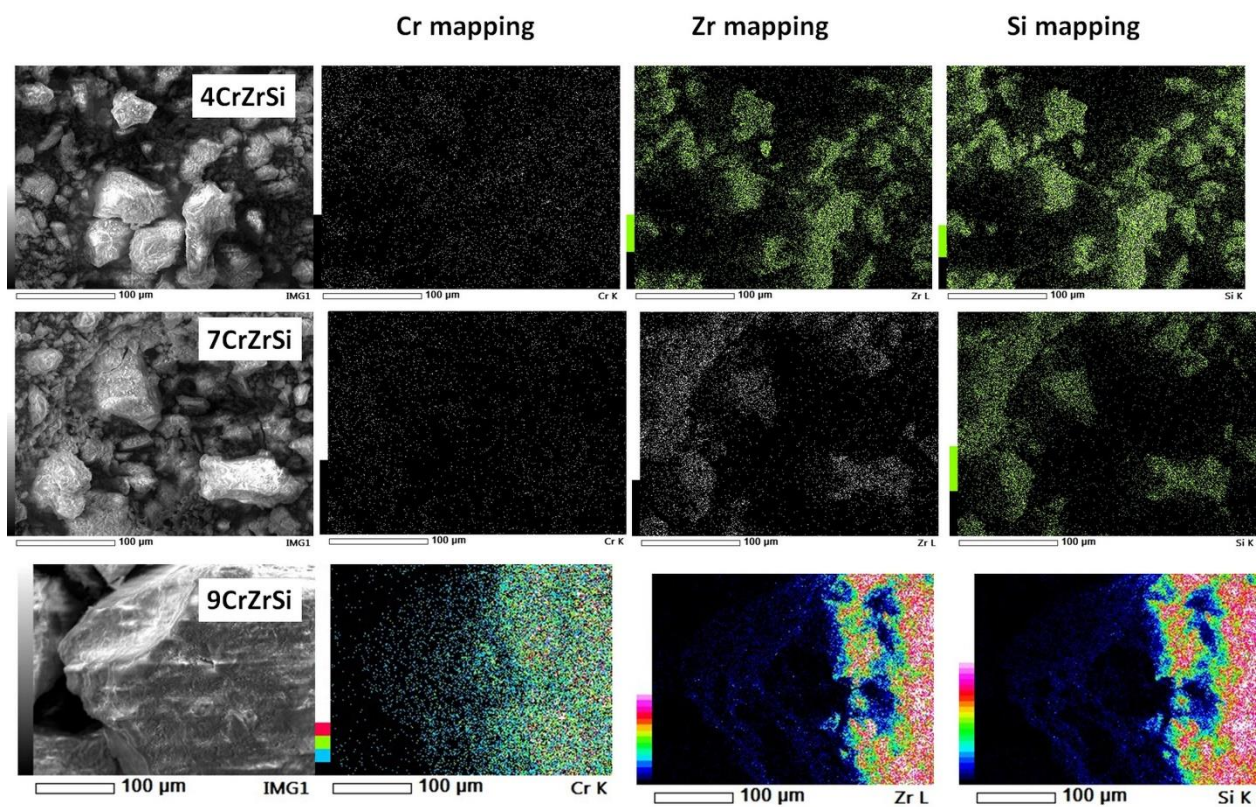


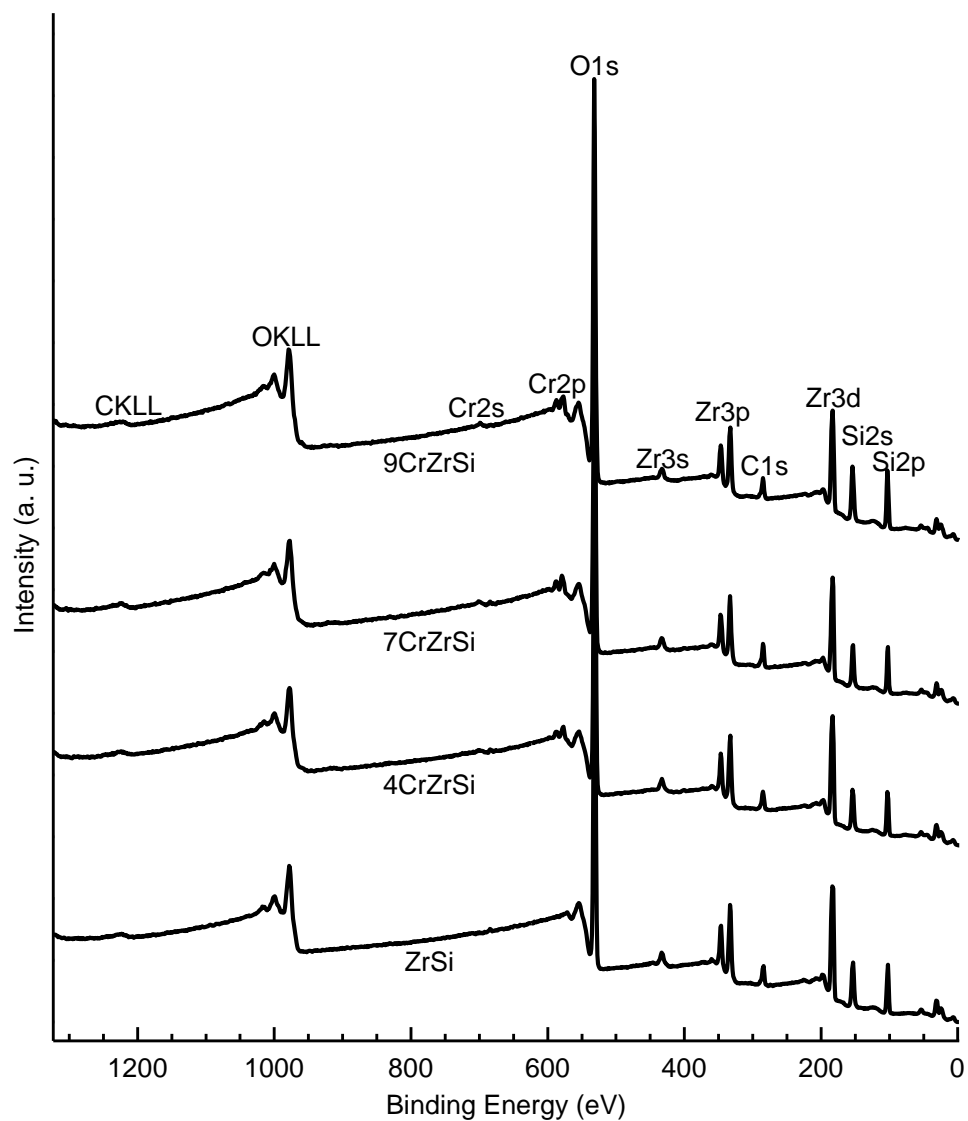
## Supplementary materials for article

Non-oxidative propane dehydrogenation on  $\text{CrO}_x\text{-ZrO}_2\text{-SiO}_2$  catalyst prepared by one-pot template-assisted method

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**Figure S1.** SEM images and SEM-EDX elemental mappings of fresh CrZrSi catalysts.



**Figure S2.** Survey XPS spectra of fresh ZrSi and CrZrSi catalysts

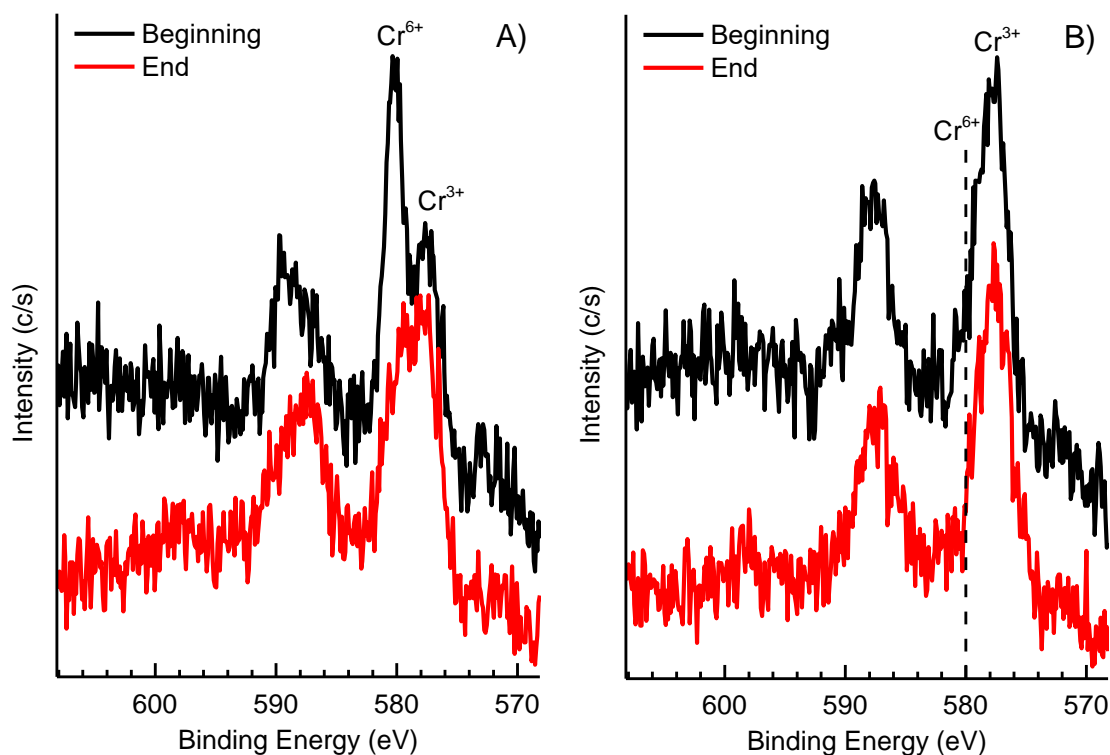


Figure S3. Cr2p XPS spectra of fresh (A) and hydrogen treated (B) 7CrZrSi catalyst. Spectra were recorded in less than 100 s at the beginning (immediately after X-ray gun and neutralizer were switched on) and at the end of XPS experiment.

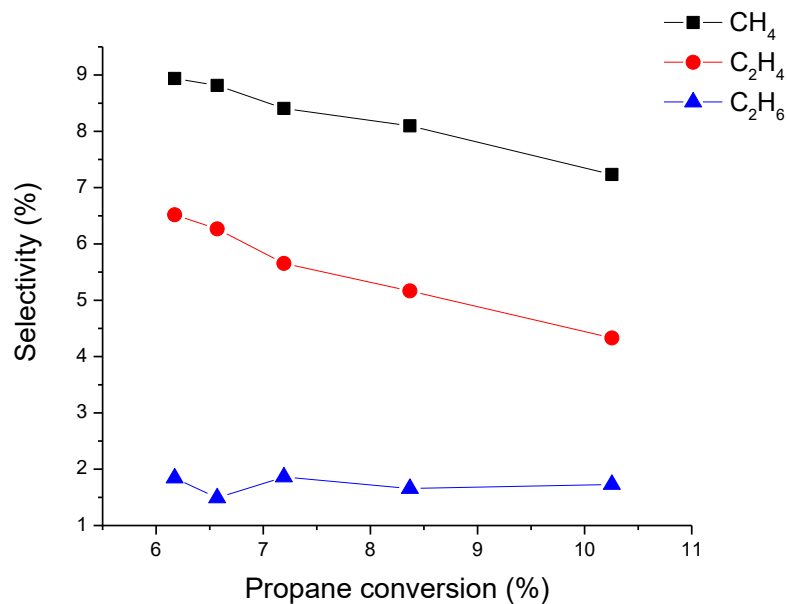


Figure S4. CH<sub>4</sub>, C<sub>2</sub>H<sub>4</sub> and C<sub>2</sub>H<sub>6</sub> selectivities vs propane conversion during PDH at 600°C on 9CrZrSi

**Table S1.** Binding energies of XPS peaks for the fresh and hydrogen treated ZrSi and CrZrSi catalysts and reference compounds. Both experimental and literature binding energies were corrected to C1s peak at 285.0 eV.

Sample	Si2p	Zr3d <sub>5/2</sub>	Cr2p <sub>3/2</sub>		C1s	Reference
			Cr <sup>3+</sup>	Cr <sup>6+</sup>		This work
ZrSi	103.2	183.1			285.0	This work
4CrZrSi	103.1	183.0	577.5	580.1	285.0	This work
7CrZrSi	102.9	182.9	577.3	580.0	285.0	This work
9CrZrSi	103.3	182.9	577.3	580.2	285.0	This work
4CrZrSi_H2	102.9	182.9	577.6	580.1	285.0	This work
7CrZrSi_H2	103.2	183.0	577.7	579.9	285.0	This work
9CrZrSi_H2	103.5	183.1	577.3	579.9	285.0	This work
ZrO <sub>2</sub>		182.5			285.0	[1]
SiO <sub>2</sub>	103.0				285.0	[1]
ZrSiO <sub>4</sub>	103.4	183.6			285.0	[1]
Cr <sub>2</sub> O <sub>3</sub>			576.7		285.0	[2]
Cr(OH) <sub>3</sub>			577.5		285.0	[3]
CrO <sub>3</sub>				579.8	285.0	[3]

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