

# Development of Novel Water Splitting Materials for the Production of Renewable Hydrogen

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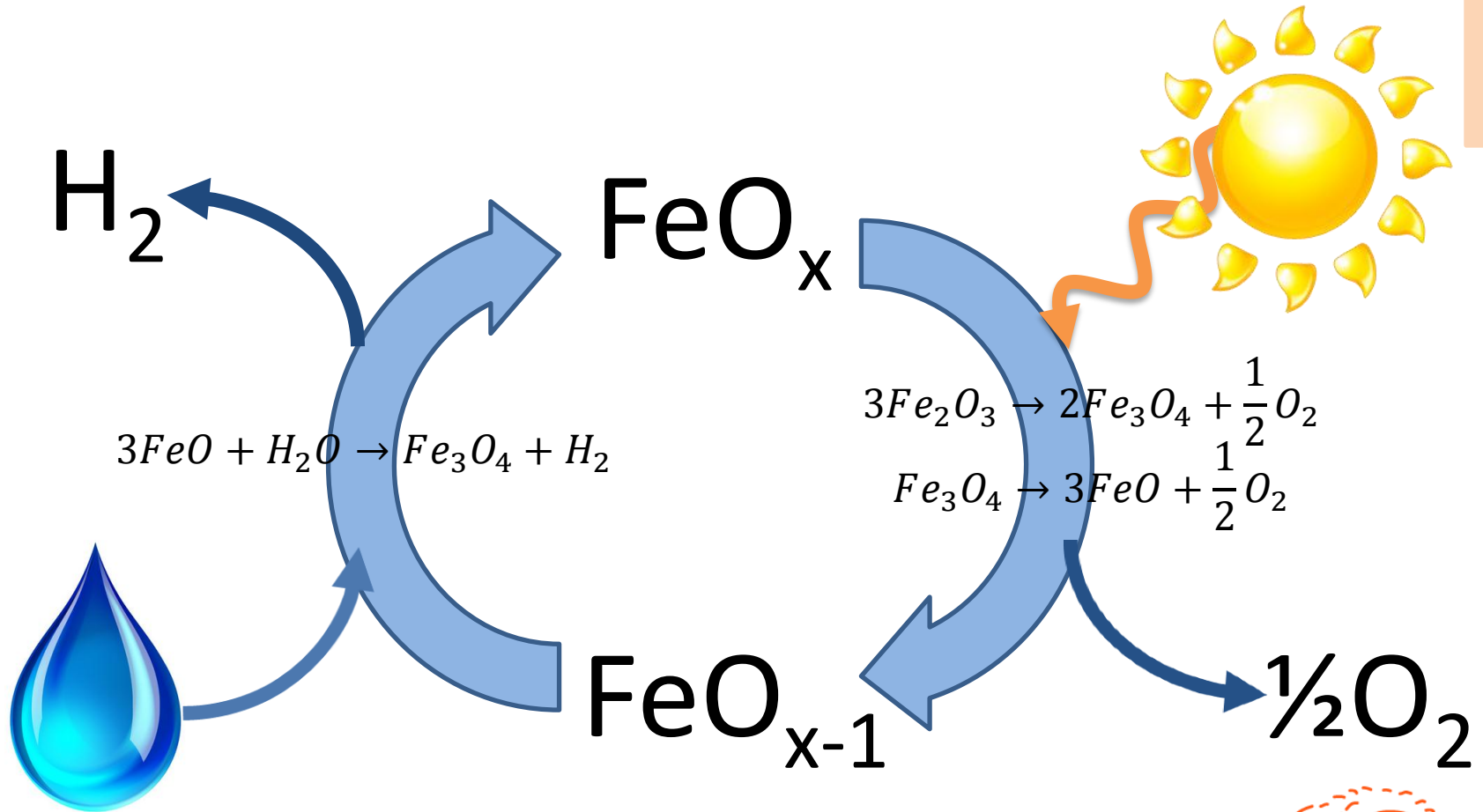
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FESC Workshop

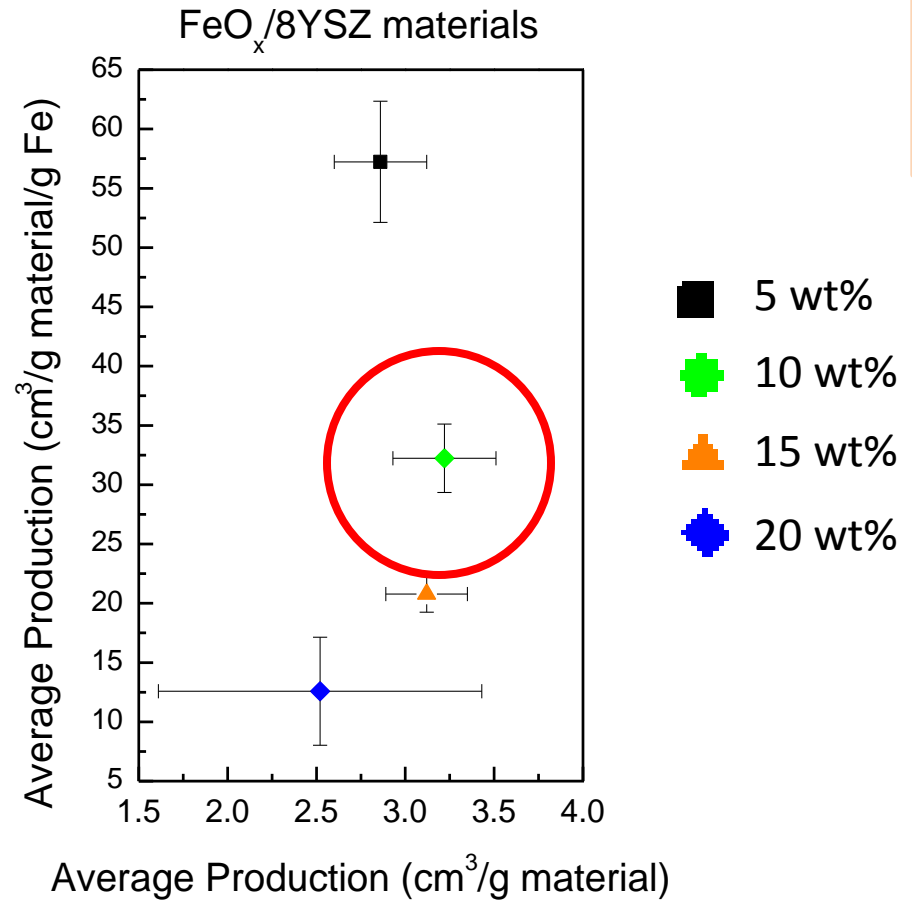
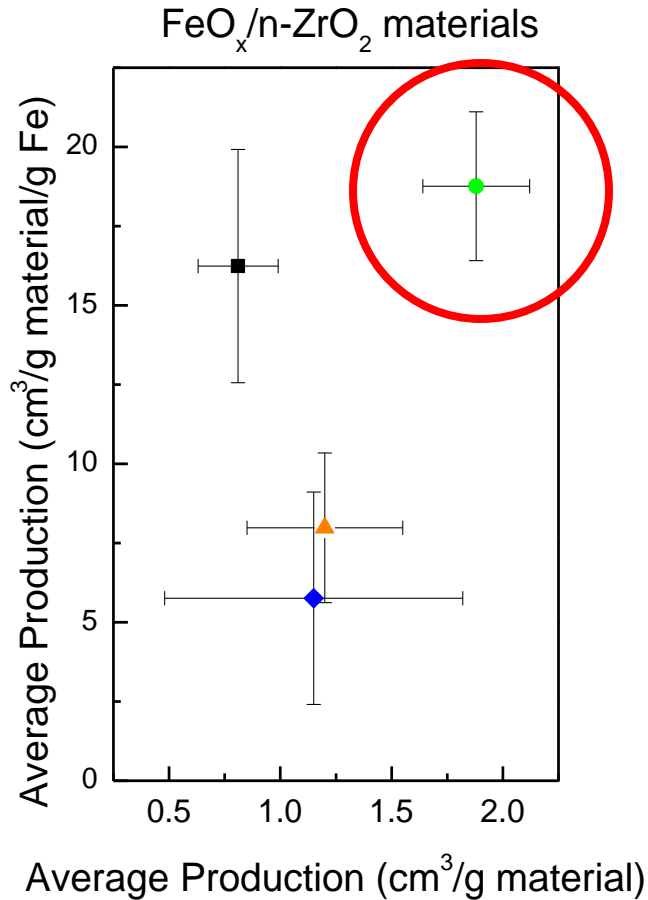
May 12, 2014



# Two-step Iron Oxide Cycle



# Hydrogen Production

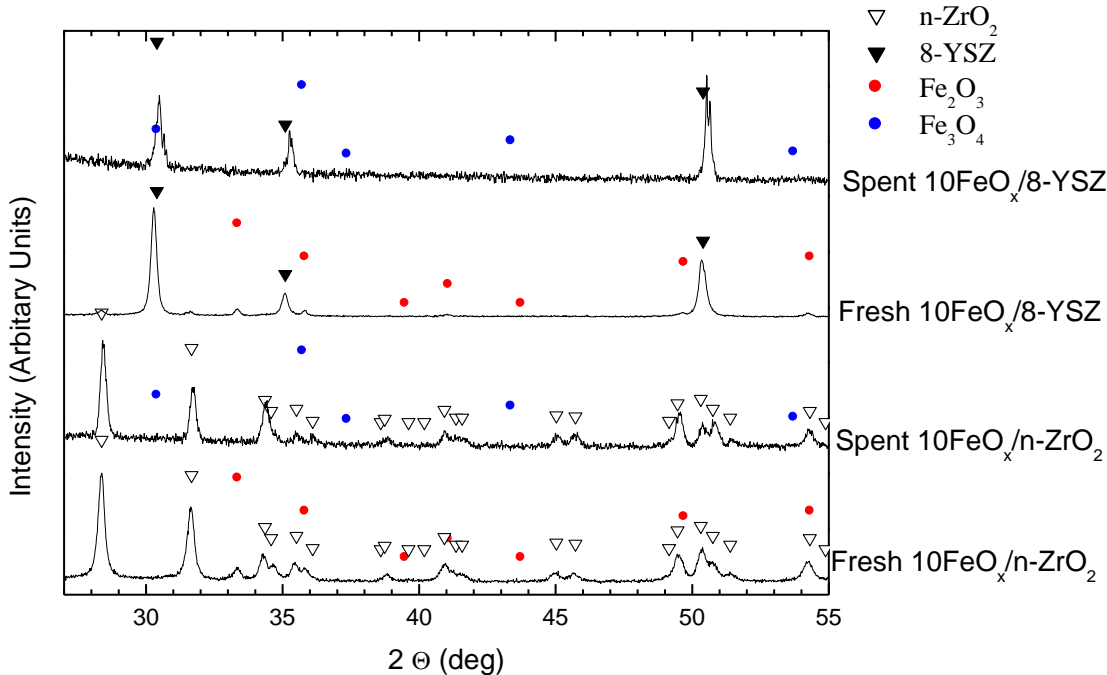


Introduction

Preliminary Data

Characterizations

# Characterizations



Material	Fresh SSA (m <sup>2</sup> g <sup>-1</sup> )	Spent SSA (m <sup>2</sup> g <sup>-1</sup> )
10 wt% FeO <sub>x</sub> /n-ZrO <sub>2</sub>	9.5	0.8
10 wt% FeO <sub>x</sub> /8-YSZ	8.1	1.9

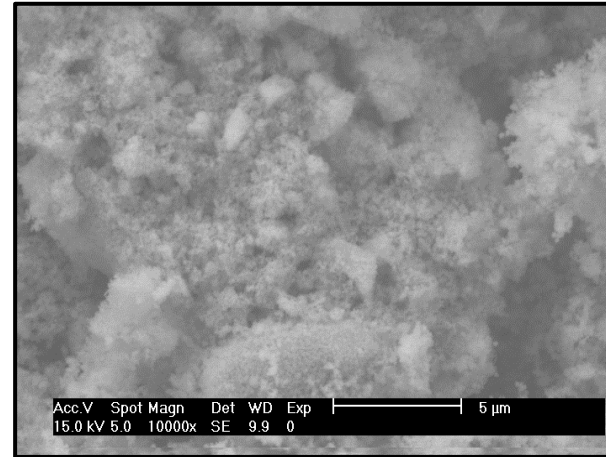
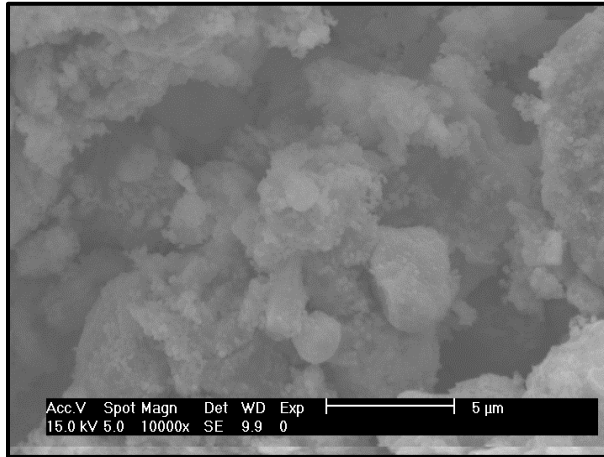
- Fe<sub>2</sub>O<sub>3</sub> changes to Fe<sub>3</sub>O<sub>4</sub> after reaction
- Fe<sub>3</sub>O<sub>4</sub> feature disappears for 8-YSZ
- Particle size increase (XRD) and surface area decrease (BET) shows support sintering

# Characterizations

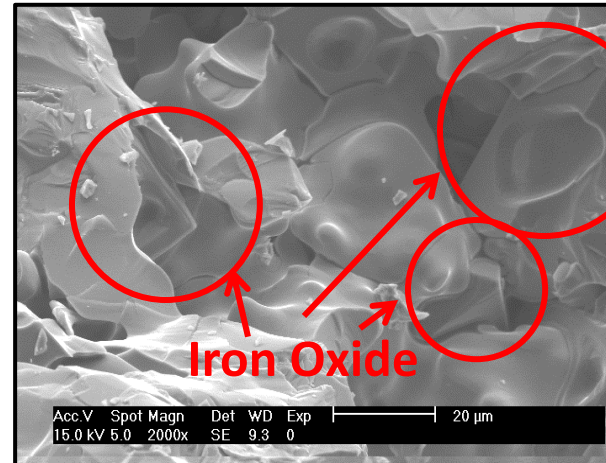
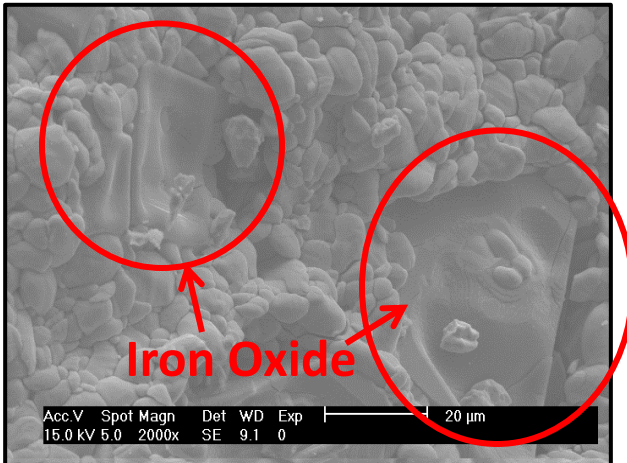
10 wt% FeO<sub>x</sub>/n-ZrO<sub>2</sub>

10 wt% FeO<sub>x</sub>/8-YSZ

FRESH



SPENT



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