Green Minerals

1. Turning CO_2 into Value

MSc Pol Knops

KIVI-jaarcongres 2018: Circulaire Economie
maandag 19 november 2018
Saxion in Enschede

2. Circulair economy

Circularity	Stage	Discussions
Bio-based	Well known	Food/Fuels/Fibers
CO2-based	New kid on the block	Energy R&D

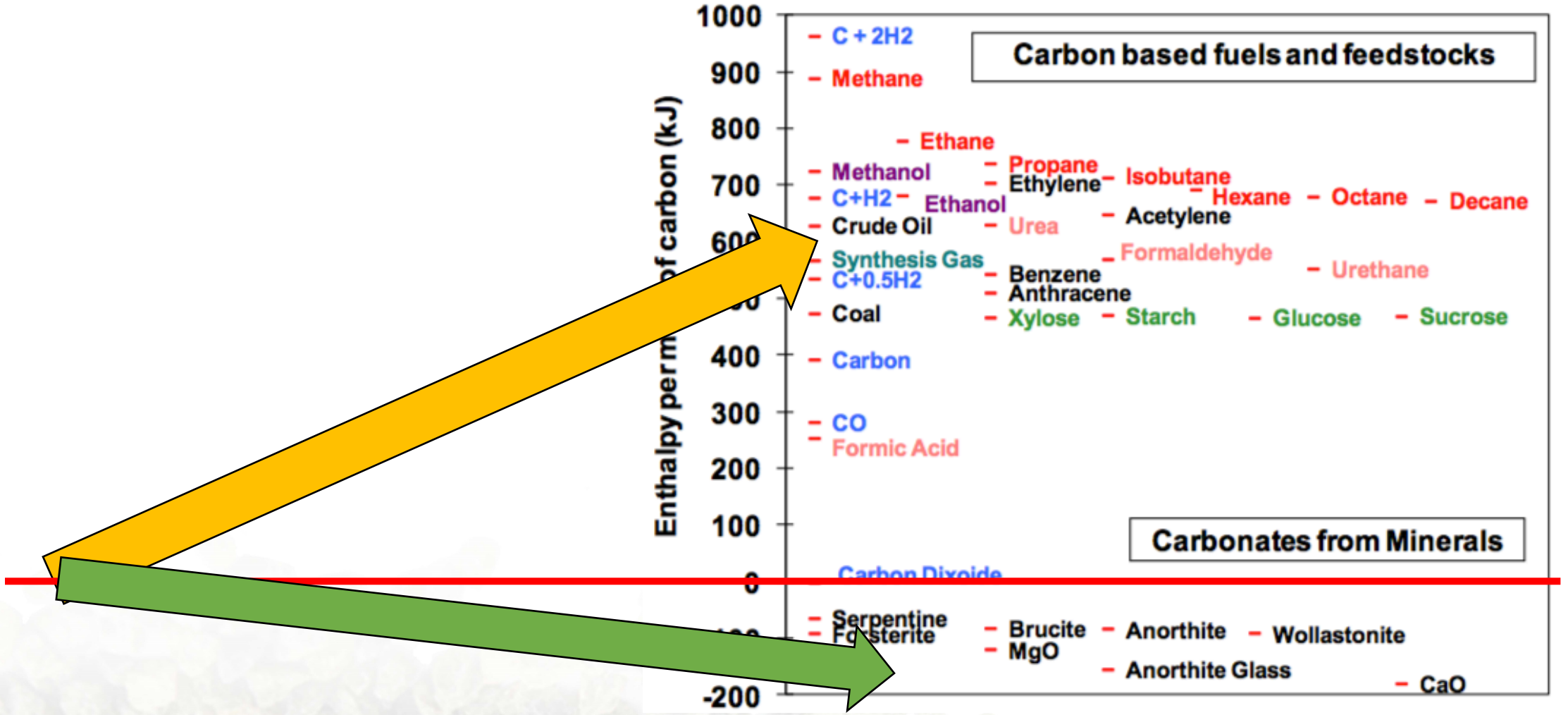
Green Minerals

3. CO_2 Uses

CO_2 Uses:	Product	Company
Fuels	Diesel	Audi / DIFFER
Chemicals	Poly-urethane	Covestro
Minerals	**Carbonates (Solid CO2)**	**Carbon8**

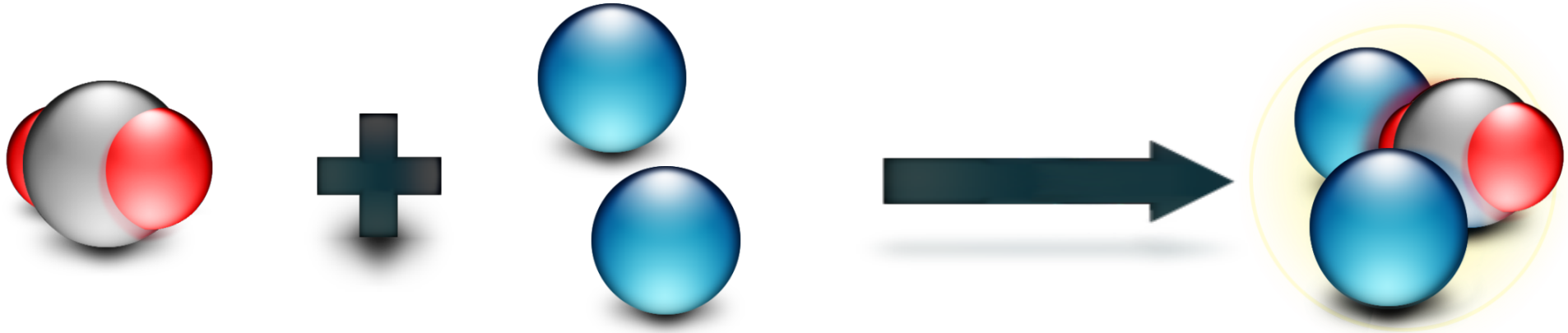
Green Minerals

4. Energy levels



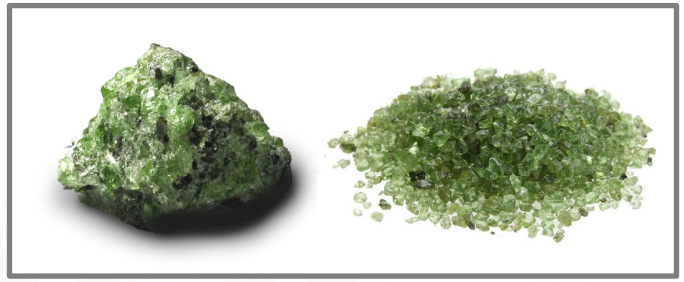
Green Minerals

5. Mineralization – Trapping CO_2



CO_2

Olivine



Green Minerals

Green Minerals

6. Reaction

Mineralization reaction of Green Minerals:

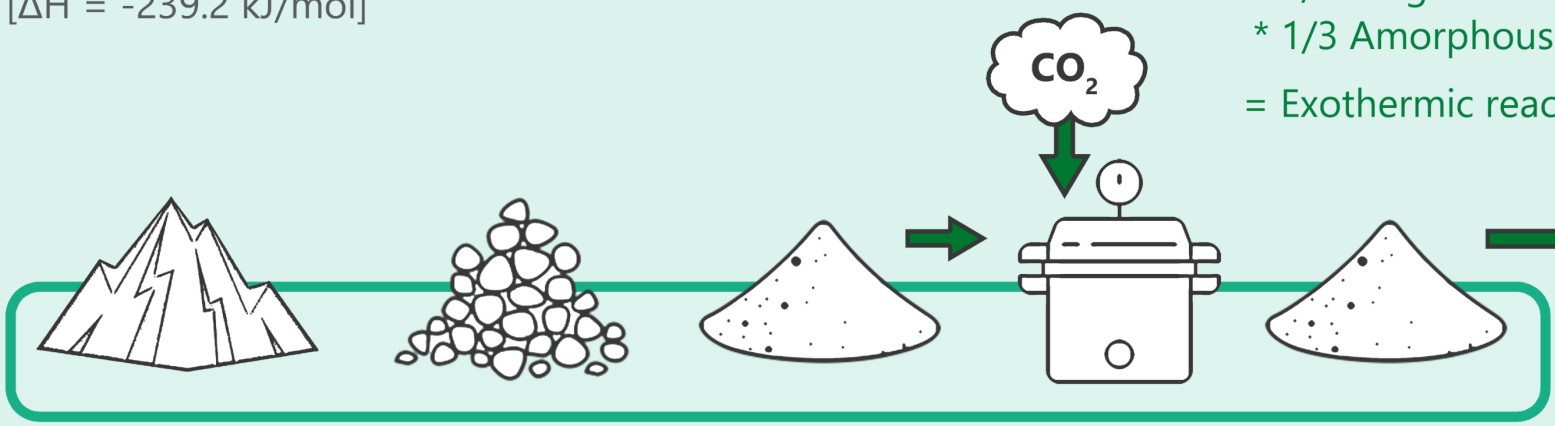
Mg_2SiO_4 (olivine) + $2CO_2$ => $2MgCO_3$ + SiO_2

[ΔH = -239.2 kJ/mol]

CO_2 additive contains very small particles

* 2/3 Magnesite
* 1/3 Amorphous Silica

= Exothermic reaction



Olivine rock = Green Mineral

Crushing

Ground olivine

Ground olivine reacts with CO_2

CO_2 additive: $MgCO_3$ + SiO_2 = 1/3 CO_2

Unique selling point: CO_2 sequestration and making valuable products for markets

Green Minerals

7. Market & Status quo

Concrete:	Packing density	RWTH ✓	HeidelbergCement ✓
Paper:	PCC/Lime replacement	Uni Darmstadt ✓	_____. ❑
Polymer:	Talc/Lime/Wollastonite	Uni Maastricht	_____. ❑

Same functionality, product replacement

CO_2 stored

Green Minerals

8. Challenges

- Scaling up process
- Validation beneficial use
- Market acceptance

Green Minerals

9. **Solutions to Challenges**

- Scaling up process
- Validation beneficial use
- Market acceptance

SCW Systems

Academic tests

End-users

Policy support

Green Minerals

Green Minerals

Turning CO_2 into Value

MSc Pol Knops
Founder Green Minerals

www.green-minerals.nl
Tel: +31 6 5130 4842
pol@green-minerals.nl