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Future sludge management – a thermal perspective

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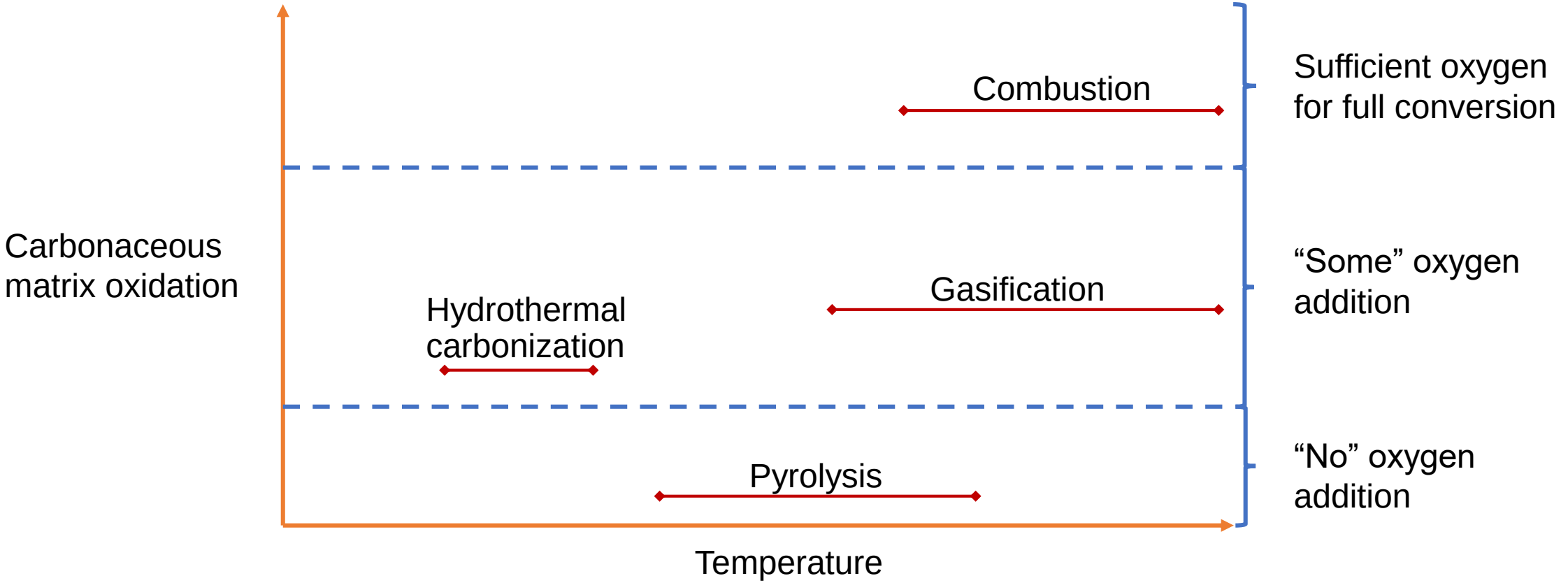
How do we view sludge as a fuel?

Water	Drying?
Carbon	Energy carriers
Hydrogen	
Nitrogen	N_2, some NO_x (or?)
Phosphorus	Found in solids (-ish)
Other elements	Ash-forming

Overview of thermal processes



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Sludge in thermal processes - considerations

In-process

- Water content important
- High amounts of ash forming elements (>30 w/w-%, dry basis)
- Gaseous emissions – SO_x, self-reduction of NO_x

Practical

- Handling – transport to plants
- Mono- or co-conversion?
- Legislation – made-up waste classification obstacles

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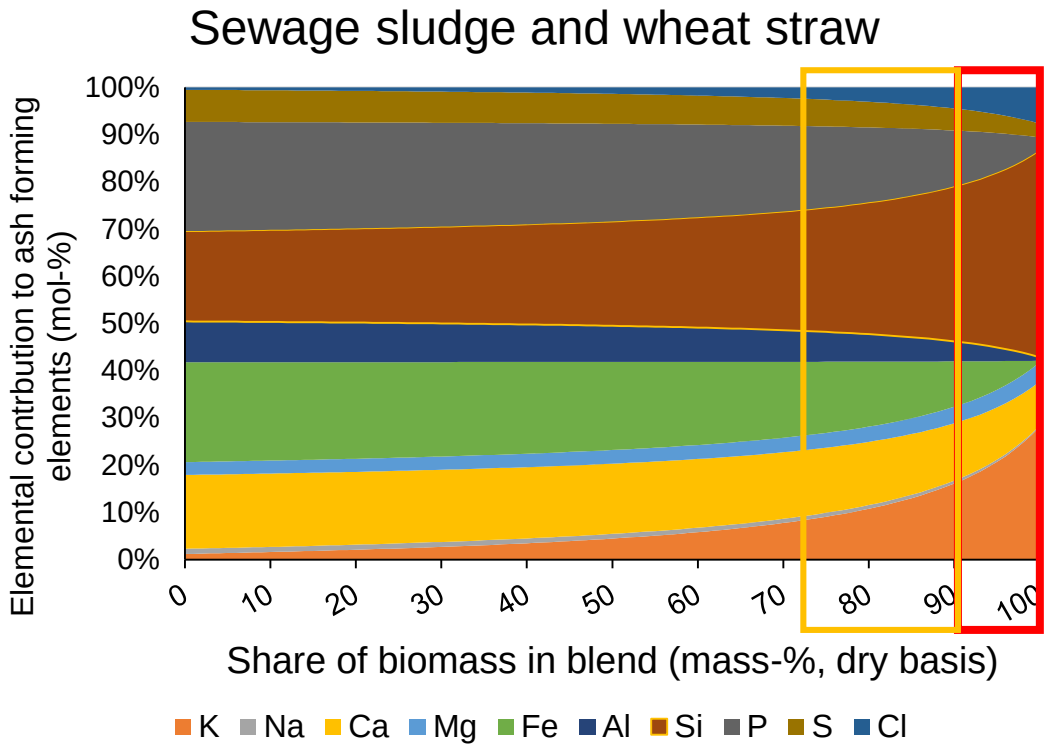
Enabling co-conversion – why?

?

- Water
- Carbon
- Hydrogen
- Nitrogen
- Phosphorus
- Other elements



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Sludge in thermal processes - possibilities

- Separation of P from elements such as Hg, Cd, Zn, As
- Value from energy or in gasification, products
- Co-conversion to improve phosphate properties (mainly alkali inclusion)
- Emission control at specific sources
- Recovery of relevant ash-forming elements
- Contribute to shifting bioenergy from forests to agricultural residues and waste

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