Institute of
Engineering Thermodynamics

Advanced studies on thermal stability and alteration of molten nitrate salts used as heat storage media

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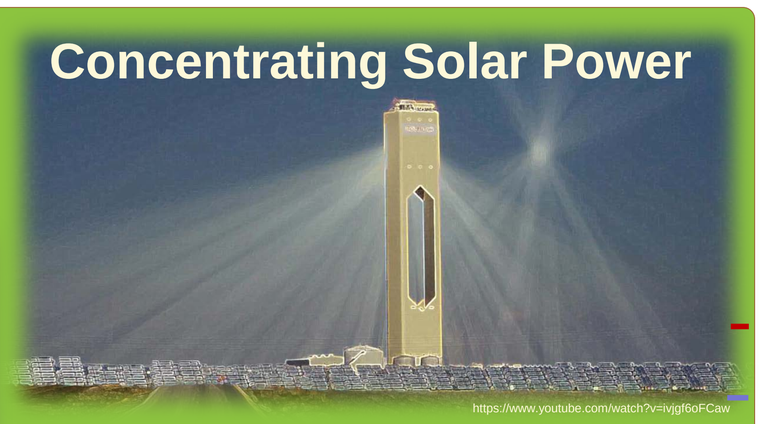
Heat is Power…

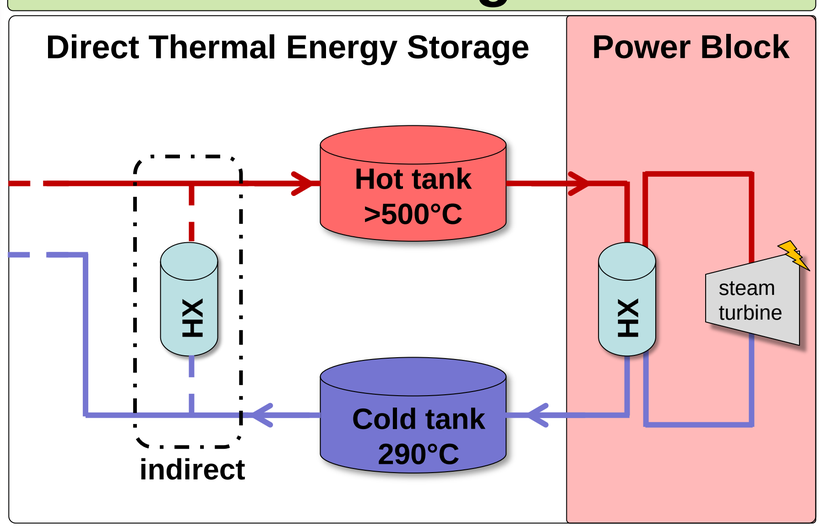
http://www.planet-wissen.de/gesellschaft/wirtschaft/ttip/ttip-private-schiedsgerichte-100.html



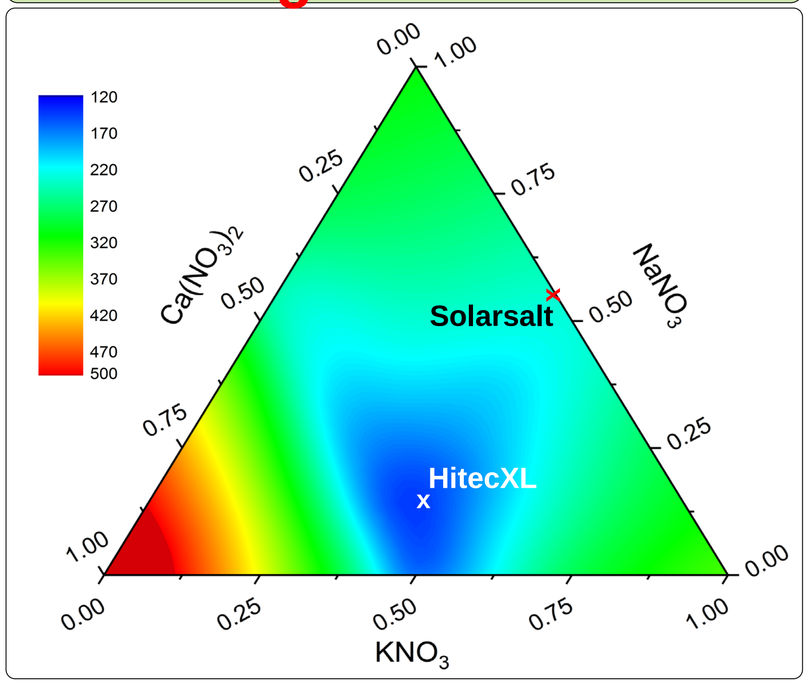
https://www.youtube.com/watch?v=ivjgf6oFCaw

…let‘s capture it

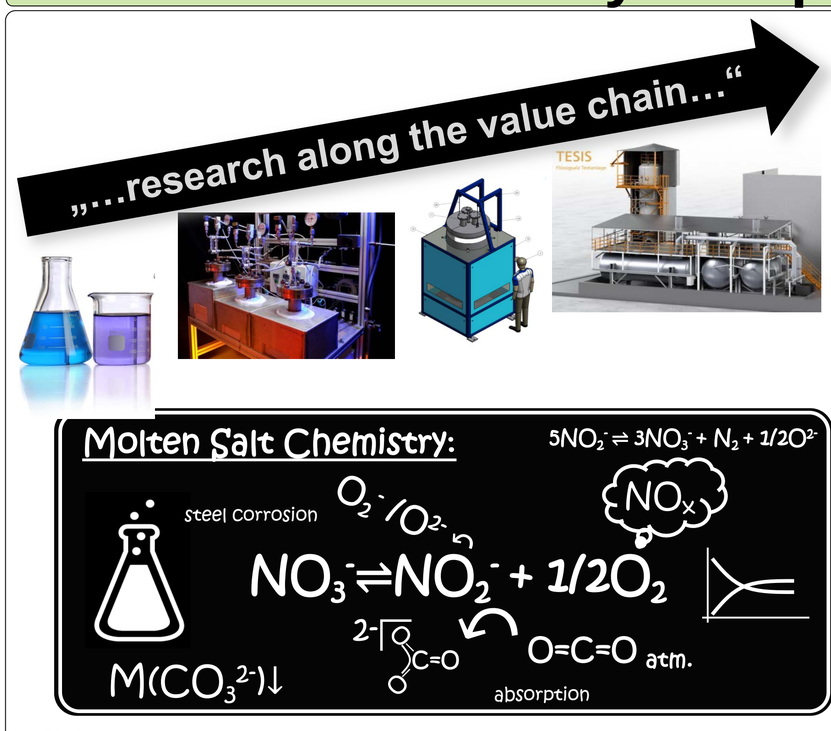
Thermal Energy Storage Technologies



Thermal Properties of storage candidates



Theory & Experimental



https://ehschem.wordpress.com

<u>Storage under relevant conditions</u>

From *mg* to *t*-scale

defined **atmosphere**

long term (min. 500h)

successive sample **extraction & analysis of salt composition**

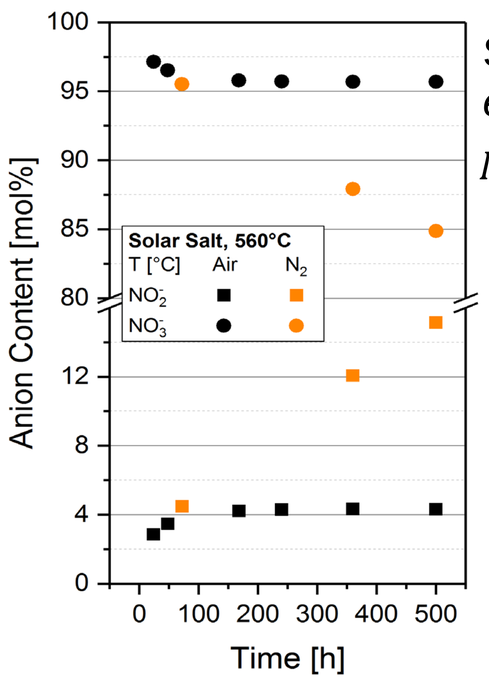
<u>Analytic methods:</u>

Ion chromatography

Titration

Results – Molten Salt Chemistry

<u>Synthetic</u> gas:



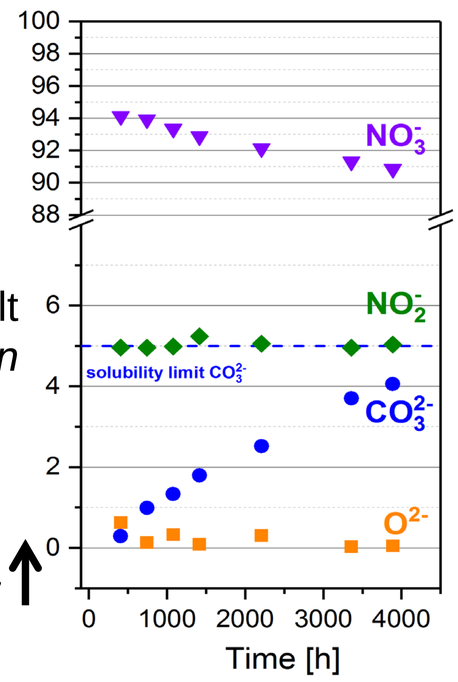
Salt chemistry in *equilibrium*

$$NO_3^- \rightleftharpoons NO_2^- + {}^1/_2\, O_2$$

Steady salt *decomposition*

NO_2^- CO_2 → $N_xO_y\uparrow$ CO_3^{2-}

<u>Atmospheric</u> gas:



Conclusions

Gas composition ⇔ salt chemistry

Decomposition **or** Stability?

Molten salts act as **CO_2 sponge**

HitecXL less stable than Solar Salt

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