Mizuno R20 replication

Important missing information for successful replication was identified and is described in this paper.

Material preparation is extremely important factor. When done thoroughly and correctly, excess heat will be generated immediately after introducing Deuterium.

The most common reason for failure is to load Hydrogen inside the lattice. This is absolutely wrong and not necessary, because with increasing loading ratio of the transition metal reaction rate will slow down or vanish.

Reaction rate is roughly defined as follows:
$\upsilon = ts/L$

t … temperature
s … main transition metal surface area with structures in a nanometer size range
L … loading ratio of the main transition metal

By introducing Hydrogen it is immediately captured by lattice. The bigger pressure inside the cell, the bigger tendency to load the Hydrogen will be achieved.

PROBLEM – cell require Hydrogen atmosphere but Hydrogen inside the lattice will dampen the reaction.
SOLUTION - when pressure is sufficiently low, Hydrogen is loaded only in a limited extent.
FINDING - In Mizuno cell type it is needed to find optimal equilibrium for the pressure.

Low pressure will cause that the lattice will start to desorb Hydrogen on its own, especially at elevated temperatures.
If by mistake loading ratio is too high, please maintain low pressure until Hydrogen is desorbed to a sufficient ratio.
Loading of the Hydrogen is in the most cases irreversible and the mesh can produce no excess heat even after long treatment!

Pressure balance and loading ratio is key factor for sustaining reaction.

Reaction is extremely stable and temperature dependent.

Recommended steps to initiate excess heat after mesh preparation:

1. Vacuum the cell.
2. Introduce Hydrogen at pressure 10 – 50 milibar as slow as possible.
3. Increase temperature.
4. With increasing temperature COP will increase too.

What is not recommended:

- Do not introduce Hydrogen at temperatures above 50°C.
- Do not introduce Hydrogen repeatedly – each additional pressure step will cause Hydrogen to load and chance for excess heat will become minimal.
- Do not pump the cell at temperatures above 50°C once reaction started.

It is very easy to end up with no excess heat, because Mesh can be already so saturated with Hydrogen you will be unable to release the Hydrogen back even if all previous steps were correct. Hydrogen is trapped inside the lattice very strongly, so it is almost impossible to get into the original condition.

What is possible?
Stop reactor and start it after several days, while Excess heat should be present in the same extent when temperature will return. Nothing except starting/stopping electrical input is needed.

What is not required?
- It is not needed to vacuum the cell with turbomolecular or ion pumps. Two stage rotary vane pump is just fine.
- It is not needed to use a tap water at all
- It is not needed that mesh is completely sterile, impurities are not big issue
- It is not needed that reactor is heated uniformly, but it is better because excess heat can be more equal through the mesh.
- It is not needed that heater is in the center

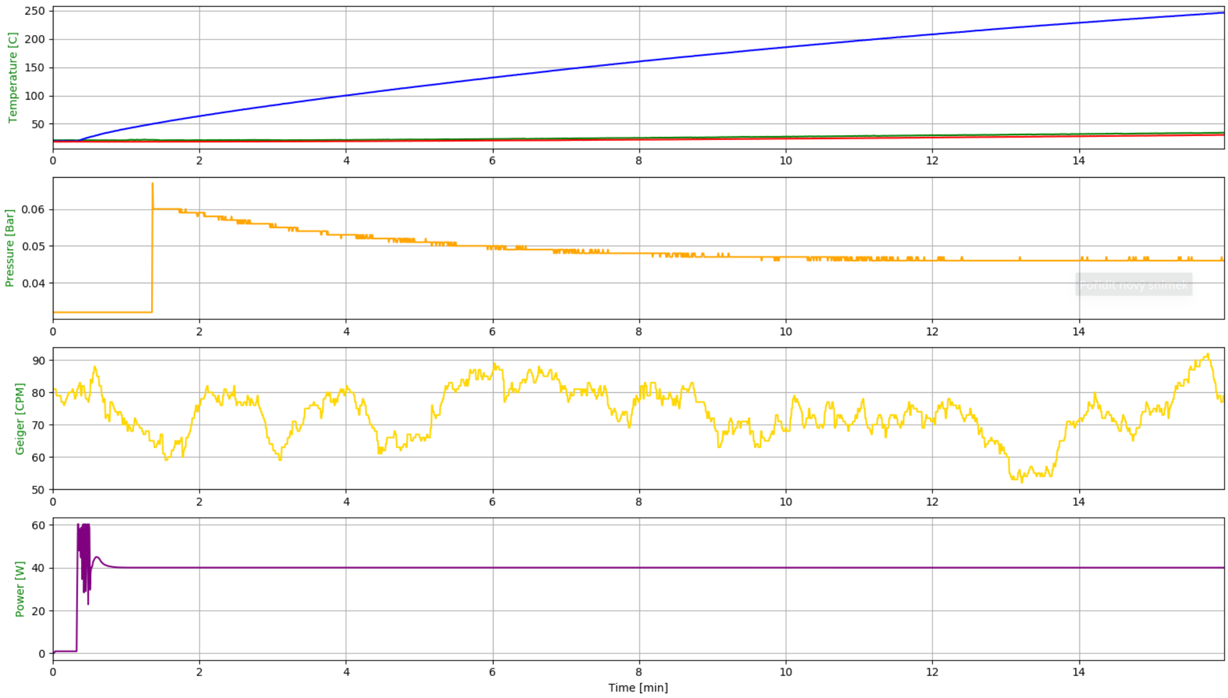
What was observed?
- Reaction can be easily killed or halted when pressure is manipulated in any way irreversibly.
- It is very sensitive for any pressure changes.
- When Hydrogen is introduced for the first time clear loading should happen even at ambient temperature.
- Radiation readings are elevated, usually when cell contain impurities such as oxygen and nitrogen.
- Cell temperature can constantly rise for days if reaction rate is dampened by too high loading.
- When you will pump out the Hydrogen reaction will not stop immediately, but will slow down smoothly.
- Pumping can cause that reaction will move to a different place of the mesh.
- Reaction rate is not uniform through the mesh. There are very big temperature differences. 3 cm away and temperature can be 70°C different at 200°C avg. temp. Measuring with IR Camera is recommended.

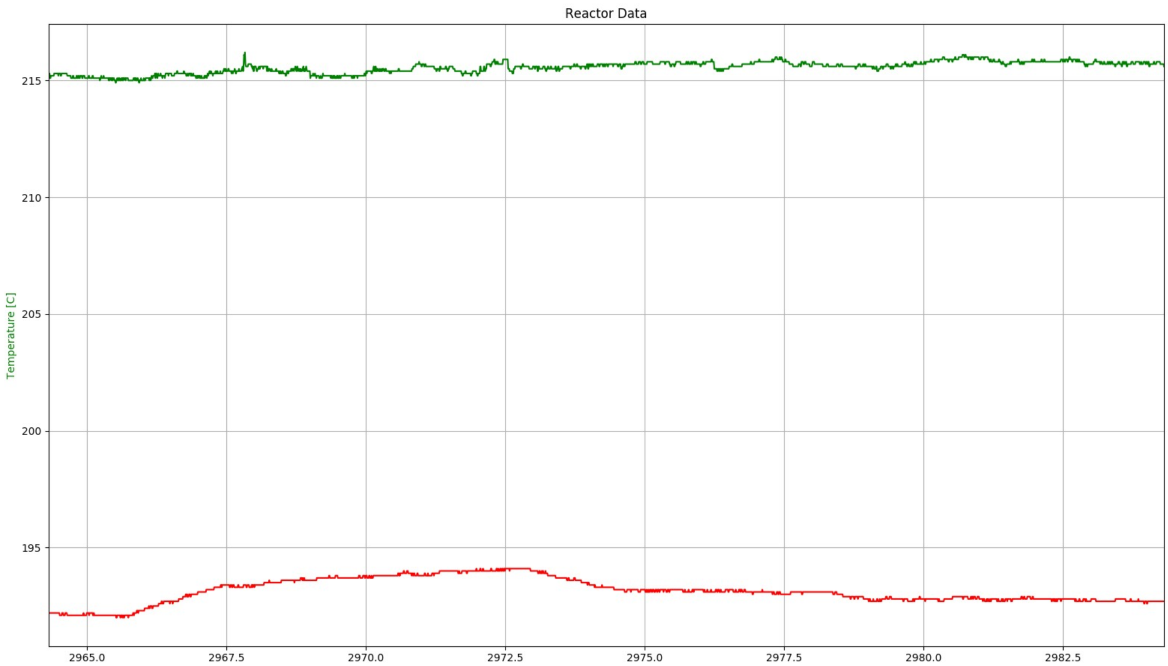
What was achieved?
COP 2 at 40W input power – internal temperature around 400°C
COP 2+ at higher temperatures – to be determined
Deuterium 99,8% from LindeGas was used
Results were repeatedly replicated

What we can offer?
Sending unlimited amount of fully processed meshes for evaluation, worldwide.

Ing. Tomáš Jędrzejek
Spirit Energetics, CEO

Photos


Temperature [C]
Pressure [Bar]
Geiger [CPM]
Power [W]
Time [min]


Reactor Data
Temperature [C]