**Catalytic flow microreactor B**

**Equipment:** [**Katalytický průtočný mikro-reaktor - B**](http://www.jh-inst.cas.cz/nanocentrum/instruments.php?stav=view_detail&dokument=7)

**No. of Equipment: UFCH 10**

**Responsible coordinator:** Zdenek Sobalik

**Name of Institution:** J. Heyrovsky Institute of Physical Chemistry of the ASCR, v. v. i.

**Address of Institution:** Dolejškova 2155/3, 182 23 Prague 8, Czech Republic,

**E-mail:** [zdenek.sobalik@jh-inst.cas.cz](mailto:zdenek.sobalik@jh-inst.cas.cz)

**Telephone:** +420 26605 3646

**Homepage:** http://www.jh-inst.cas.cz

**Contact person:** Zdenek Sobalik

**E-mail:** [zdenek.sobalik@jh-inst.cas.cz](mailto:zdenek.sobalik@jh-inst.cas.cz)

**Telephone:** +420 26605 3646

**Equipment Description**

**Description of equipment:**

The Microactivity-Reference reactor (PCT/ES2005/070079) is an automatic and computerized laboratory catalytic micro-reactor which includes the valves and process layout in a hot box to avoid the possible condensation of volatile products, at the same time that preheats the reactants efficiently.

* Hotbox Maximum recommended temperature 180ºC.
* Reactor oven Maximum temperature 1000ºC, ± 2ºC.
* Tubular reactor Autoclave Engineers in SS 316, max recommended temp. 750ºC, with porous plate in Hastelloy C-276, 20 microns, i.d. = 9,2 mm, L = 300 mm,
* Thermocouple ∅= 1,5 mm, Incoloy, directly in catalyst bed.
* Valve VICI 6 ports, 2 positions, 280ºC, 100 bars, for reactor bypass.
* Up to 6 Mass Flow Controllers, as standard, Hi-Tec Bronkhorst, precision 1% FS, repeatability 0.1%, with process compatible elastomers.
* Maximum working pressure 100 bar,
* 250ºC@1,5m Heated line to Chromatograph transfer connection, simple controller.

**Specification of expertise relevant to NanoEnviCz workpackages:**

**WP4**a-c, **WP5**a-c

**Detailed description of expertise**

**Please, specify the main research topics connected with equipment**:

**Catalytic performance of materials for heterogeneous catalysis**

Catalysts based on zeolites and metal/Metal-oxo materials.

**Please, specify the secondary research topics connected with equipment**:

**Catalytic processes**

Redox-catalysed reactions (NH3-SCR-NOx, CxHy-SCR-NO, deN2O, selective oxidation)

Acid-catalysed reactions for petrochemicals and refinery (Isomerization C5-C7, Cracking of paraffins and olefins, Alkylation of aromatics , MTH)

**Controlling catalytic properties**

Role of acid and redox sites for catalysis, correlation between the structure and the catalysis performance of nanostructured materials, process of deactivation.

**Keywords describing research area:**

Synthesis on nanomaterials, Heterogeneous catalysis, Catalytic processes

**Competence**

**Relevance for applied and industrial research:**

Versatile catalytic characterization under standard and controlled conditions, kinetic analysis, deactivation . Possibilities for screening and kinetic testing of heterogeneously catalysed reactions.

Exploitation of f**undamental understanding** of materials structure/activity for novel synthesis and large scale production of catalysts.

**Relevance for fundamental studies:**

Studying kinetics of heterogeneously catalysed reactions.

Synthesis of catalysts with structure tailored on a molecular level.

Analysis of the relationships between structural properties on the molecular level and catalytic activity.