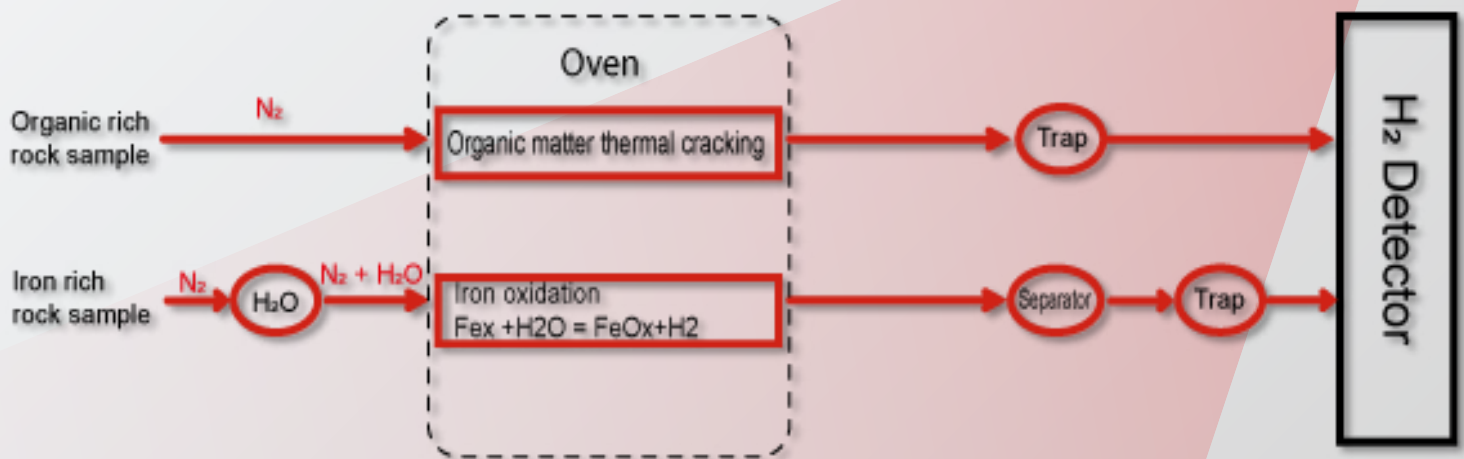


HYDROGEN-EVAL^{®*}

Natural Hydrogen Exploration Device

Vinci Technologies, a leader company in geochemistry and rock assessment equipment, proposes a new all-in-one laboratory size instrument to assess the natural hydrogen potential from a source rock.

Several processes can be involved into natural hydrogen generation and the **Hydrogen-Eval** explore two of the mains types of generation i.e. hydrogen from **organic mater** thermal cracking and hydrogen produced by **water interaction with iron rich minerals**. This solution provides easy start-up, automatic and time-saving analyses, robust results, and simple maintenance. It is the perfect tool for assessing hydrogen **source rocks kinetic** whether they are organic rich or iron rich rocks as well as for their transportation and storage. The Hydrogen-Eval can perform several steps of analysis usually done manually in the lab, and even give additional information on hydrogen source rocks, with minimum operating time.

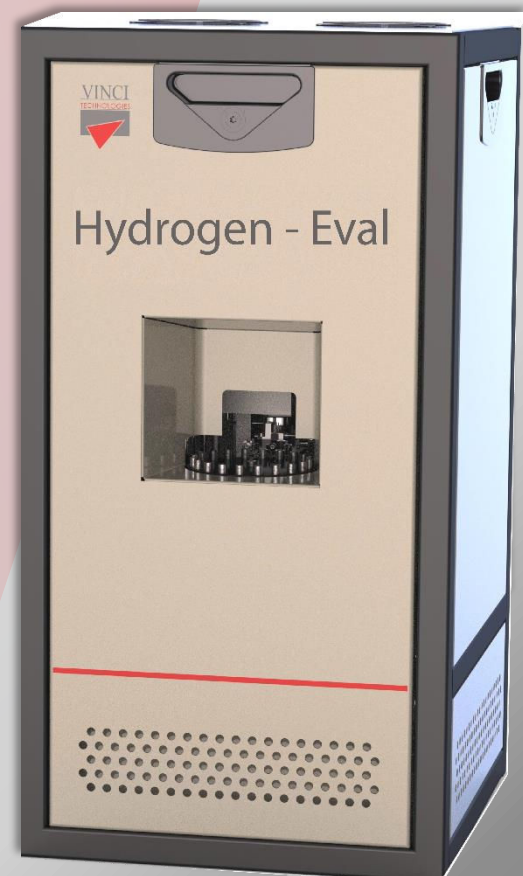


Main Features

The Hydrogen-Eval is a bench-scale automatic thermal analyzer based on a temperatures programmed oven coupled with an H₂ detector, two different modes are available:

- 1st mode, is used for analyzing hydrogen that comes from organic matter thermal cracking and performing kinetic studies. The carrier gas is **dry nitrogen** (N₂).
- 2nd mode, is used to quantify the hydrogen potential of an Iron-rich rock by water interaction. In this case the carrier gas is **wet nitrogen**. The concentration of water inside the carrier gas is configurable according to the water tank temperature.
- The device is equipped with a TDLAS detector selective only to the Hydrogen with a very small limit of detection (LOD) to quantify low concentration of H₂.

*Patent pending



HYDROGEN-EVAL

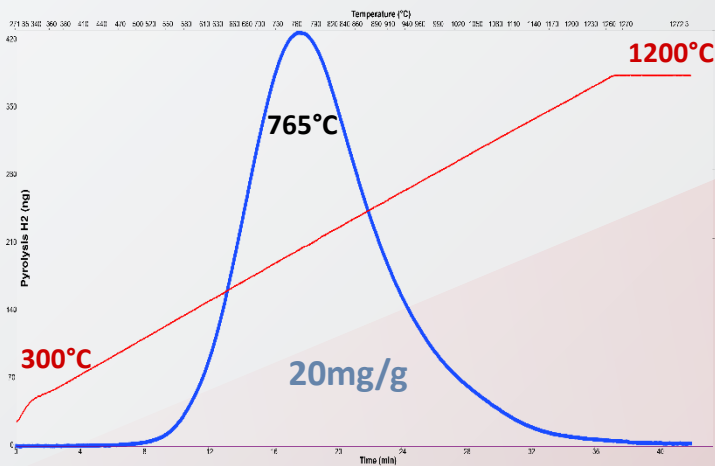
Natural Hydrogen Exploration Device

Organic rich rock sample

Inert dry atmosphere (N₂)

- Hydrogen potential quantification
- Hydrogen Tpeak determination
- Kinetic hydrogen computation

Figure 1: Hydrogen generation from a coal sample

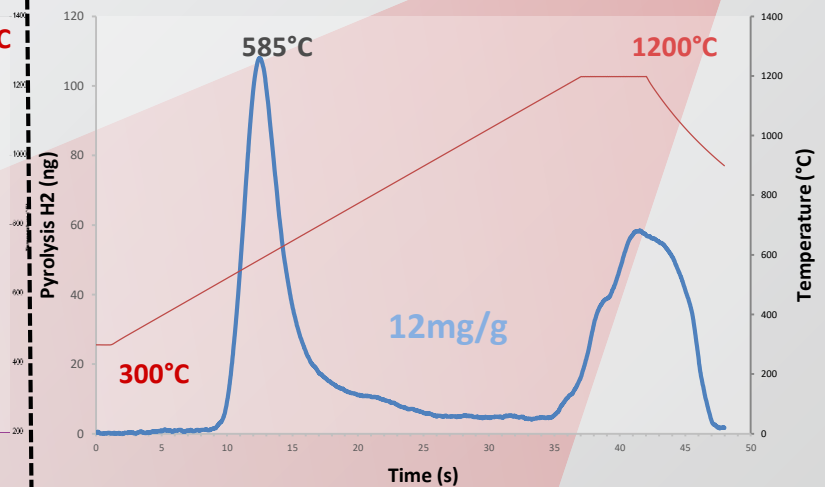


Iron rich rock sample

Inert wet atmosphere (N₂)

- Hydrogen quantification
- Hydrogen Tpeak determination
- Kinetic hydrogen computation

Figure 2: Hydrogen generation from a BIF sample (Bounded Iron Formation) containing siderite



Operation	
Sample preparation	No prior sample preparation is necessary – 100mg of sample must be weighted
Technical specifications	
Sampler	Automatic sampler with 24 positions, continuous 24/7 unattended operation
Crucible volume	0.25 cc
Temperature limits	From 30°C up to 1200°C (Pyrolysis oven)
Temperature ramps	From 0.5 to 50°C.min ⁻¹
Analysis duration	From 30 minutes to 2 hours, depending analysis cycles
PC Software	Geoworks Basic for display parameters and results interpretation (Kinetics module in option)
Detectors	
TDLAS	Quantify low concentration H ₂ (±1.4ng)

Note: The Hydrogen-Eval is still under development process, consequently its technical properties may change or evolve in the future

Vinci-Technologies – Parc de l'Île - 27B rue du Port - 92022 NANTERRE cedex - France
 tel.: +33 1 41 37 92 20 – fax: +33 1 41 37 04 76 – e-mail: vincinet@vinci-technologies.com
 Visit our website <http://www.vinci-technologies.com>

