AGH Research Offer

NMR Maran Ultra 23MHz - Nuclear Magnetic Resonance spectrometer

NMR Nuclear Magnetic Resonance

Equipment: Maran Ultra 23 MHz, Resonance Instruments Ltd., GB

Technical description:

Purpose: the spectrometer is designed to test the content of hydrogen (water and other hydrogen-containing compounds) in rocks, soils, sands, construction, chemical, medical, food). To determine the total and effective porosity and saturation distribution.

Tests are carried out on samples of **solids (including cores, pieces of rock), liquid and gaseous (properly prepared and secured sample).**

Measurements variants:

1. **Standard measurement** - analysis of the saturation distribution using the NMR method (total porosity, effective porosity, saturation with irreducible water, free, capillary and bound water content), double measurement for a dry and saturated sample, using the spin echo method, standard T2cutoffs and individually selected.

2. **Non-standard measurement** - analysis of saturation distribution by NMR (total porosity, effective porosity, saturation with irreducible water, free, capillary and bound water content), calculation of permeability and pore size distribution, interpretation using non-standard procedures, individually adjusted T2cutoffs according to the individually created procedure.

3. Measurements in various saturation conditions, the use of multiple measurement sequences.

Based on the shape of the NMR signal, it is possible to analyse the size, shape and mobility of pore media. The amplitude of the NMR signal depends on the number of resonating hydrogen nuclei contained in the sample. It is a measure of the porosity of the rock, the pores of which are filled with the saturation medium. From the total signal, components related to the volume of free water, capillary water and bound water in clay minerals are extracted.

Preparation devices: shaping samples, weighing, measuring, drying, saturating and centrifuging.

Trade name: NMR MaranUltra 23MHz, Resonance Instruments Ltd., GB

More details: /equipment/nmr-maran-ultra-23mhz-spektrometr-magnetycznego-re/

Access type: External

Type of accreditation / certificate: Not applicable

Contact person: Puskarczyk Edyta

Contact person url: https://skos.agh.edu.pl/osoba/edyta-puskarczyk-7167.html

Responsible body: Department of Geophysics

Group / laboratory / team: Laboratory of Petrophysics / NMR Nuclear Magnetic Resonance / Petrophysics Group

Last update date: May 27, 2023, 3:20 p.m.

Year of commissioning: 2010

IDUB research areas:

(PRA 1) Sustainable energy technologies, renewable sources of energy, energy storage, and resource management. Design, production, application, synergy, and process integration
(PRA 3) Water-energy-climate: interdisciplinary approach to sustainable development
(PRA 7) Design, production, and testing of modern materials and the technologies of the future based on a multidisciplinary approach combining materials engineering with chemistry, physics, mathematics, and medicine

Research capabilities:

Measured and determined parameters:

total, effective and dynamic porosity
the volume of water saturating the pore space with the division of clay bound water, water closed in capillary pores and free water
irreducible water saturation factor, SWIRR
permeability coefficient, PERM
pore radius
pore size distribution, PSD

Measurement capabilities:

Spectrometric measurement **T1, T2, diffusion**
Standard and individually fitted cutoffs
A set of certified measurement standards for calibrating results
Software for measurements, storage, processing and interpretation
Specimen dimensions: 1 inch diameter plugs and app. 1.5 inch high or crushed sample or liquid or mixture of liquid and solid

Conditions for providing infrastructure:

The research infrastructure can be used (as part of scientific cooperation or for a fee), but it is not possible to use the equipment on their own. Measurements will be performed at the installation place by a person authorized by the laboratory manager.