

# **Modeling of Grain Sorting Effect on Petro-Physical Properties of Sandstone at Different Lithification Factors**

**ASIF ZAMIR, EMAD S. AL-HOMADHI, King Saud University, Riyadh, Saudi Arabia**

## **Abstract**

Petro physical properties form a set of essential parameters in petroleum engineering. They are the basic tools to obtain reliable information by which reservoir rocks may be described quantitatively, in order to assist petroleum engineers in the evaluation of hydrocarbon reserves and for planning well completion and optimize production operations during reservoir life. The petro physical properties, include Porosity and permeability, evaluate the capacity of the rock to occupy the fluid in it and the flow of that fluid. The fluid occupation inside the rock and the ability of the rock to flow depends mainly on grain size and sorting, cementing material concentration, and compaction pressure.

The intention involved in this research to produce artificial homogeneous sandstone rock sample with known Lithification factors and then tested to know their petro physical properties. A mathematical model produced to show the above effect of the grain sorting on rock permeability and porosity by changing other Lithification factors such as cementing material concentration and compaction pressure. The experimental part is to produce a range of The sandstone cores of different grain sorting factor (at different compaction pressure and cementation) with wide ranges produced in the laboratory and these cores was saturated with brine to measure their porosity and then flow test performed to measure permeability of each core. The sorting versus permeability and porosity relationship was analyzed and came up with a mathematical model which can simulate this relation with good accuracy.