

THERMAL CONDUCTIVITY OF SEDIMENTARY ROCKS IN THE LOWER INDUS BASIN, SINDH, PAKISTAN

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Abstract: Thermal conductivity plays a significant role in fields such as oil and gas exploration, geotechnical engineering, and mining industry. Knowledge of thermal properties of rocks is essential in investigating the geothermal gradients and thermal maturity of different reservoir bearing formations. Unfortunately, thermal property data on Pakistan's most producing basin, lower Indus basin, does not exist and is least known. Hence, the study has also carried out thermal conductivity experiments along with other petrophysical properties on sedimentary rocks obtained from lower Indus basin. The experiments conducted include but are not limited to thermal conductivity, porosity, permeability, and X-ray diffraction (XRD) tests. It was observed from experimental results that samples containing a slightly higher percentage of clay have lower thermal conductivity as it acted as insulating to the heat conduction. Results obtained were cross plotted and displayed that there is reasonable relationship between thermal conductivity and porosity values however, no clear relationship appears between thermal conductivity and permeability. XRD showed that the dominating mineral within sandstones samples were quartz with minor quantity of illite and smectite.

Key words: *Thermal conductivity, Eocene strata, Sedimentary rock, thermal properties of rocks, lower Indus basin*

1. Introduction

Thermal conductivity of sedimentary rocks is important in understanding the geothermal gradients, thermal evolution, earth internal dynamics and thermal maturity of different reservoir bearing formations (Tang et al.2018; Tosi et al., 2013). Understanding the mechanism of the earth's internal structure, temperature distribution of the earth underneath and the history of the earth's