

HELIUM GAS IN THE PETROLIFEROUS TUBE WELLS IN SAUGOR DIVISION, SOUTHERN GANGA BASIN REGION, INDIA

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The studies on the helium gas in the petroliferous tube wells in Saugor Division, Southern Ganga Basin region has been carried out in great detail in 50 tube wells, along with the stable isotopic analysis carried out for the gas sample collected from the 50 tube wells in Sagar and Damoh District of MP. The discovery of the rare gas helium in hydrocarbon rich zone in the tube wells in agricultural field at Garhakota, Rahatgarh, Bina, Banda and Sagar tahsils, of Sagar and Batiyagarh, Patharia, and Jabera, tahsils of Damoh District of MP is a unique finding in rocks of the Vindhyan Super Group, in the history of Earth Science in India. The depth of tube wells are varying in 300 feet to 750 feet. On the basis of geochemical analysis, it is remarkable to note that average values of helium contents varies from 0.34% to 0.732% along with the 72% to 99 % of methane and ethane, and minor amount of oxygen, nitrogen and CO₂ gases in the hydrocarbon rich zone are recorded during the geochemical and stable isotope analysis. It has been found in the stable isotope $\delta^{13}\text{C}$ value the values for the methane is -43.6 per mil w.r.t. to -54.9 per mil w.r.t. PDB and for the Ethane gas is -24.9 to -26.4 per mil w.r.t. PDB in the gas samples collected in the saturated sodium chloride solution in the glass bottles at various sites in Sagar and Damoh District. The occurrence of rare helium gas in the hydrocarbon rich zone is reported first time in Jan' 2007 from the tube wells of Sagar Dist, which were geochemically and stable isotopically analysed in the labs of KDMIPE Dehradun and NGRI Hyderabad. The gaseous hydrocarbon analysis showed the presence of moderate to low concentration of methane (C₁): 1 to 104 ppb; Ethane (C₂): 1 to 14 ppb; Propane (C₃): 1 to 10 ppb; isobutane (i-C₄): 1 to 9 ppb and n-butane (n-C₄): 1 to 8 ppb in the soil samples collected from different locations in Sagar District. The result of the stable isotopic analysis of ethane gas in these samples, $\delta^{13}\text{C}$ values are ranging from -24.9 per mill w.r.t. PDB and -26.9 per mill w.r.t. PDB are indicative that this gas is of thermogenic origin, which must have been formed at very high temperature and pressure condition in the deeper horizon of the Great Vindhyan sedimentary basin of an early Proterozoic (> 600 m.y.) period.

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