

Petrographic Analysis of Diagenetic Properties of Helium Producing Rock in Arizona

Dalton Seymour¹

¹ Metropolitan State University of Denver

Abstract

Gas and fluid resources in the subsurface are unequivocally important to the expansion of the modern world. To understand how we can characterize superior reservoir rock and its most important cap rock, we need to understand its diagenetic history. Through petrographic analysis of thin sections from the Holbrook basin in Arizona, a region of significant helium production, a visual comparison can be made to understand the complexities of subsurface fluid flow, and more specifically, research gaps on newer units within the region can be gauged to this superior rock. Through varying thin-section processes, such as pore structure dyeing with a standard translucent bluing medium, as well as Rhodamine-B fluorescent dye impregnation through vacuum and confining pressure systems. Further incorporation of scanning electron microscope images assists in producing a full-picture analysis of the sample's unique sedimentary characteristics. Calculations of permeability, porosity, and hydraulic conductivity will further fill gaps in the understanding of the Arizona basin's unique sedimentary units. The compilation of all this data via visual interpretation and calculations hopes to compile comparison data of sample properties for other superior sedimentary reservoir rock, with an emphasis on trends in producibility. By in-depth laboratory analysis of various sedimentary samples from the Arizona Holbrook area, a picture of the diagenetic history of the samples will be made in comparisons to the resultant visual and microscopic features that influence their capacity to resist or encourage the movement of fluids in the subsurface.