Investigation of Pore Structure within the Weyburn Oilfield using Synchrotron Microtomography

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Abstract/Excerpt

Synchrotron X-ray Computed Microtomography (CMT) is a powerful imaging technique that utilizes coherent and brilliant synchrotron light to produce high-resolution, three-dimensional images based on differences in X-ray attenuation within a sample. CMT provides a unique and novel approach for extracting physically realistic images of reservoir quality rocks, nondestructively with micron-scale (50µm-0.1µm) resolution. Tomographic images of rocks collected at this scale permit identification, visualization and quantification of minerals and pore structure (i.e. volume, shape, connectivity and throat radii) that can be used to obtain and understand petrophysical properties such as permeability, capillary pressure and formation factor (Kayser et al., 2006). CMT analysis can be done on small (cm-mm) sections of core, such as side-wall cores and damaged, fragile and unconsolidated samples, which has implications for using CMT methods to study future conventional and unconventional (i.e. coal bed methane (CBM), tight gas and shale gas) reservoirs (Arns et al., 2005).