Brittleness of the rock is regarded as the most crucial geomechanical property affecting hydraulic fracturing treatment to shale reservoirs. There have been many studies to define and quantify the brittleness mainly based on mineral composition of rocks and geomechanical properties including Young’s modulus and Poisson’s ratio which are calculated from sonic log data.

The aim of this study is to estimate or quantify the brittleness indices and to present the relationship between the brittleness indices and multi proxies of cores from the Besa River and Montney formations, which are major shale plays in the WCSB, Canada. For this study, calculation of Young’s modulus and Poisson’s ratio, Leeb hardness measurement of slabbed core surface, XRD, XRF, TOC, and sedimentary lithofacies analyses were conducted for the four wells.

As a result of the research, the hardness measurements are correlated positively with SiO₂ contents but negatively correlated with Al₂O₃ and K₂O contents for the Besa River formation. For the Montney formation, however, there is no substantial relationship between the hardness measurement and major oxides. TOC contents have shown no relationship with the hardness for both the Besa River and Montney formations. Also, the brittleness index estimated by the mineral composition is related to the hardness measurement.

사 사
본 연구는 한국에너지기술평가원(NO. 20178510030880)의 지원으로 수행되었습니다.