CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

The success of conventional matrix stimulation treatments with hydrochloric acid is often restricted due to rapid reaction and high corrosivity. Weak acids are also presented as substitutes because the slower reaction and lower corrosivity compared with this strong acid are found in them. Although the weak acids do not deserve the complete calcite dissolution, they are still effective stimulating fluids. From neutron radiographs, the face dissolution or complete dissolution was not observed, even when injected at extremely low injection rate. However cores were brokenthrough in conical-shaped by injecting weak acids in that region. When increasing the injection rate, a single dominant channel formation occurred. At the high injection rate, the increasingly channel branching were noticed. In other words, the wormhole structures change from conical-shaped channels to highly ramified channels along with the increasing injection rate.

Two alternative stimulation fluids of formic acid (HFc) and maleic acid (HM) were capable to form wormholes. They exhibited an optimum injection rate at which the number of pore volumes to breakthrough was minimized. The neutron radiograph result insisted the existence of this preferable rate causing single dominant wormhole channels. These

observations are consistent with the dependence of the wormhole structure on the Damköhler number.

The calcite dissolution relies on the heterogeneous reactions. The sequential steps consist of the transport of reactants to surface, the reversible reaction on surface, and the transport of products from the surface to the bulk fluid. Furthermore, various parameters accidentally involve. They are led to simplify the Damköhler number at approximately 0.29 for a wide range of fluid/solid rock systems when compared with the previous results (Fredd, 1998).