Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Effects of gel properties produced by chemical reactions on viscous fingering TOMOHIRO UJIIE, YUICHIRO NAGATSU, MITSUMASA BAN, SHUICHI IWATA, YOSHIHITO KATO, YUTAKA TADA, Nagoya Institute of Technology, Japan — We have experimentally investigated viscous fingering with chemical reaction producing gel. Here, two systems were employed. In one system, sodium polyacrylate (SPA) solution and ferric ion solution were used as the more and less viscous liquids, respectively. In another system, xthantan gum (XG) solution and the ferric ion solution were used as the more and less viscous liquids, respectively. For high concentration of ferric ion, viscous fingering pattern was changed into spiral pattern in the former system, whereas into fracture pattern in the latter system. We consider that the difference in the change of the patterns in the two systems will be caused by the difference in the properties of the gels. Therefore, we have measured the rheological properties of the gels by means of a rheometer. We have found that the gel in the former case is more elastic. Furthermore, we have discussed the relationship between the measured rheological properties and the observed spiral or fracturing patterns.

Tomohiro Ujiie
Nagoya Institute of Technology, Japan

Date submitted: 04 Aug 2011 Electronic form version 1.4