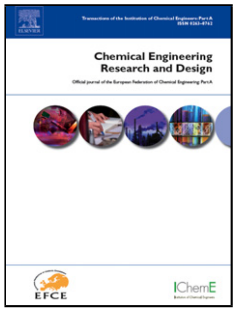
Accepted Manuscript



Title: Experimental study of alcoholic retarded acid systems for high temperature gas wells acidizing process

Author: P. Fayzi A. Mirvakili M.R. Rahimpour M. Farsi A. Jahanmiri

PII: S0263-8762(14)00260-3
DOI: http://dx.doi.org/doi:10.1016/j.cherd.2014.06.003
Reference: CHERD 1609

To appear in:

Received date: 26-1-2013
Revised date: 8-5-2014
Accepted date: 4-6-2014

Please cite this article as: Fayzi, P., Mirvakili, A., Rahimpour, M.R., Farsi, M., Jahanmiri, A.,Experimental study of alcoholic retarded acid systems for high temperature gas wells acidizing process, *Chemical Engineering Research and Design* (2014), http://dx.doi.org/10.1016/j.cherd.2014.06.003

Experimental study of alcoholic retarded acid systems for high temperature gas wells acidizing process

P. Fayzi[a], A. Mirvakili[a], M.R. Rahimpour[a,1], M. Farsi[a], A. Jahanmiri[a]

[a] Department of Chemical Engineering, School of Chemical and Petroleum Engineering, Shiraz University, Shiraz 7193616511, Iran

Abstract:

Matrix acidizing treatments are applied to gas wells to remove near-wellbore permeability impairment (formation damage).This work relates to the use of some alcoholic components as a retarding agent in gas field acidizing operations to reduce rate of calcium carbonate (dolomite $MgCa(CO_3)_2$) dissolution by acid. The retarding agent is feasible to "retard" acid formulations and slow down their reaction rates to allow deeper penetration of live acid or preferential creation of large wormholes through any near-wellbore damage. In this study, two new alcoholic retarding acid systems (RE 1, RE 2) are presented. RE 2 is stable up to 75˚C, highly retarded compared to the straight acid. Laboratory data comparing alcoholic retarding acid with commercial retarding acid (F-98) and straight acid are shown at temperatures ranging up to 75˚C. Moreover, results show that RE 1 is a proper retarding agent for low temperature and deep gas well acidizing. Reaction rates of RE 1 and RE 2 (acid systems) with dolomite $MgCa(CO_3)_2$ are slower than the reaction rate of commercial retarding acid system (F-98) at low and high temperatures. Experiments are conducted in a rotating disk instrument to measure dissolution rates of dolomite rock samples in retarding acid systems and straight acid. A rotating disk system is used at 30-75˚C under a pressure of 8 MPa and rotational speeds up to 1,200 rpm.

[1] *Corresponding author*. Tel.: +98 711 2303071; fax: +98 711 6287294.

E-mail addresses: rahimpor@shirazu.ac.ir, mrahimpour@ucdavis.edu (M.R. Rahimpour).