ABSTRACT

A salt-tolerable latex has been reported for the first time in China to prevent the latex from demulsification and precipitation in salt slurries. The latex was characterized by Dynamic Laser Light Scattering (DLS), Zeta Potential Analyzer, Differential Scanning Calorimeter (DSC) and Thermogravimetric Analyzer (TGA). The latex does not coagulate prematurely in cement and degrade in saltwater in the presence of the stabilizer compatible with multivalent-ions and saltwater. The salt-tolerable latex cement slurries, composed of API G class cement, latex, defoamer, dispersant, retarder, and fluid-loss control agent have been prepared successfully. The properties of the salt-tolerable latex cement slurries and the subsequent set cements were also investigated. The results indicate that latex is compatible with the saturated solutions of calcium chloride and sodium chloride and does not thermally degrade until 250 °C. The slurries were prepared of 17% by weight of cement (BWOC) latex, 15% by weight of water (BWOW) and aqueous solutions of sodium chloride. Subsequent set cements can exhibit many advantages such as good rheology, low fluid-loss control, anti-migration and optimum toughness. In the presence of other additives like fluid-loss control agent, set retarder etc, these cement slurries can be tailored to meet the requirements of cementing for wells having salt-gypsum beds and gas wells.

KEY WORDS: Cementing; latex cement slurries; salt-tolerance; anti-migration.

EXPERIMENTAL

Materials. Materials included API G class cement from the Jiahua cement plant of Sichuan, as well as salt-tolerable styrene butadiene latex L (including stabilizing agent), fluid loss additive F, retarder R, dispersing agent D, defoaming agents DF, and retarder agent. All materials were provided by the Boxing Company of China National Petroleum Offshore Engineering Co., Ltd.

Method. Chemical (calcium ions) stability and salt-tolerable ability of the latex L were assessed according to the method of the Zeon company in Japan. DLS at the fixed scattering angle of 90° at 25 °C was performed by a light scattering spectrometer (BI-200SM). The DSC curve was recorded by NETZSCH DSC 204 analyzer with a heating rate of 10K/min under nitrogen protection. Mechanical stability of the