

عنوان مقاله:

Ultrasonic Waves Effect on Removing Skin from Near Wellbore Region: A Modeling and Experimental Approach

محل انتشار:

ششمین کنگره بین المللی مهندسی شیمی (سال: 1388)

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خلاصه مقاله:

Although the concept of high frequency acoustic waves, for improving production from oil wells have been applied from many years ago but yet the mechanisms related to this method are not well understood. Nowadays, ultrasonic waves are applied to remove skins formed near wellbore due to asphaltene deposition and fine particles. Despite the fact that there is no document about ultrasonic wave effect on removing gas condensate in field scale studies, but it seems that this method can be used for solving this problem as well. Different mechanisms can govern these removal processes through porous media in the presence of ultrasonic field. In this paper at the first part we are going to study the effects of ultrasonic wave irradiation on relative production increase by removing phase trap induced skin due to gas condensate formation near well bore by reducing interfacial tension. To this aim firstly a mathematical model of wave influence on interface of fluids is proposed then in experimental part a modified pendant drop setup is employed and a wave generator with varying output power, 55 to 100 watts, and a constant frequency of 45 kHz is applied. It is illustrated that how ultrasonic wave's radiation could change the shape and volume of drops of oil ejecting from capillary tip which is a simplified pore in our experiment. Also it is observed that we have about 10 to 15 percent increases in cumulative production from a capillary tube at the presence of ultrasonic field. At the second part of this paper, based on the trend of viscosity versus time curves under ultrasonic wave field, resolution and scattering of asphaltene aggregates is concluded and it is confirmed by visualization under microscope based on buckley .previousworks on asphaltene instability analysis

کلمات کلیدی:

Ultrasonic waves, Interfacial tension, phase trapping, Asphaltene deposition removal, well stimulation

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