

ABSTRAK

PEMANFAATAN EKSTRAK SABUT SAWIT, ASAP CAIR CANGKANG SAWIT, DAN CAMPURANNYA SEBAGAI INHIBITOR PEMBENTUKAN KERAK KALSIMUM SULFAT (CaSO_4)

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Dalam industri minyak dan gas, masalah yang umum terjadi adalah pengendapan garam pada dinding peralatan aliran fluida, terutama pada permukaan perpindahan panas dan pada permukaan peralatan evaporasi. Pengendapan ini tidak diinginkan karena menyebabkan pembentukan kerak yang dapat mempengaruhi perpindahan panas serta mengurangi efisiensi dan menghambat proses aliran fluida.

Pada penelitian ini digunakan ekstrak sabut sawit, asap cair cangkang sawit, campuran ekstrak sabut sawit dengan asap cair cangkang sawit, dan asam etilen diamina tetra asetat (EDTA) sebagai inhibitor kalsium sulfat (CaSO_4) dengan metode *unseeded experiment* dan *seeded experiment* pada suhu 90 °C dengan variasi konsentrasi larutan pertumbuhan 0,050; 0,075; dan 0,1 M serta variasi inhibitor 5, 15, 25, 35, dan 45%.

Nilai persentase efektivitas yang paling efektif pada metode *seeded experiment* dengan larutan pertumbuhan 0,050 M. Inhibitor ekstrak sabut sawit dengan konsentrasi 35% sebesar 62,187%, asap cair cangkang sawit konsentrasi 25% sebesar 54,624%, campuran ekstrak sabut sawit dengan asap cair cangkang sawit konsentrasi inhibitor 35% dan 25% sebesar 55,962%, dan EDTA konsentrasi inhibitor 5% sebesar 95,405%. Bentuk morfologi dengan analisis SEM penambahan inhibitor kristal CaSO_4 berbentuk pendek dan berukuran kecil. Fasa kristal dengan analisis XRD penambahan inhibitor menunjukkan fasa gipsum, basanit, dan anhidrat.

Kata kunci: asap cair cangkang sawit, CaSO_4 , EDTA, ekstrak sabut sawit, inhibitor.

ABSTRACT

UTILIZATION OF PALM FIBER EXTRACT, LIQUID SMOKE OF PALM KERNEL SHELL, AND ITS MIXTURE AS AN INHIBITOR OF CALCIUM SULFATE (CaSO₄) SCALE FORMATION

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In the oil and gas industry, a common problem is salt deposition on the walls of fluid flow processing equipment, especially on heat transfer surfaces and on the surfaces of evaporation equipment. This deposition is undesirable because it causes scale formation which can affect heat transfer as well as reduce efficiency and prevent flow in the process fluid. This research was used palm fiber extract, liquid smoke of palm kernel shell, mixture of palm fiber extract with liquid smoke of palm kernel shell, and ethylene diamine tetra acetic acid (EDTA) as inhibitor calcium sulfate (CaSO₄) with methods unseeded experiment and seeded experiment at temperature of 90 °C with variations in the concentration of the growth solution 0.050; 0.075; and 0.1 M and variations in inhibitor 5, 15, 25, 35, dan 45%. The percentage value of effectiveness is most effective in the seeded experiment method with a growth solution of 0.050 M. The palm fiber extract inhibitor with a concentration of 35% was 62.187%, liquid smoke of palm kernel shell with a concentration of 25% was 54.624%, mixture of palm fiber extract with liquid smoke of palm kernel shell with an inhibitor concentration of 35% and 25% was 55.962%, and EDTA with an inhibitor concentration of 5% was 95.405%. The morphological form using SEM analysis of the addition inhibitor of the CaSO₄ crystal is short and small in size. The CaSO₄ crystal phase with XRD analysis of the addition of inhibitors shows gypsum, basanite, and anhydrate phases.

Key words: liquid smoke of palm kernel shell, CaSO₄, palm fiber extract, EDTA, inhibitor.