Supplementary Materials: Grid Independence Test

As shown in Figure S1, it is appropriate to divide the computational domain into 37,910 Delaunay triangular meshes for the numerical accuracy and computational cost.

The results obtained by direct numerical simulation method are highly correlated with grid. A grid independence test was preformed to verify the reliability of the numerical results. Figure S1 compares the oil recoveries with different grid numbers (n = 23097, n = 37910, and n = 62276). All the simulation schemes are carried out under the same initial and boundary conditions.

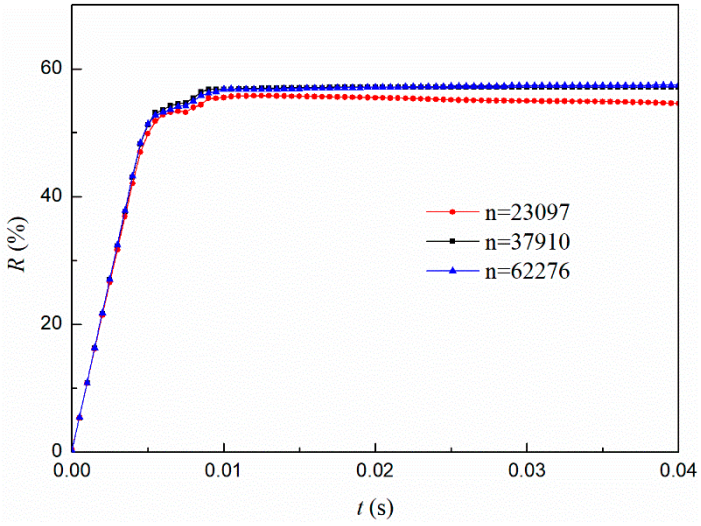

Figure S1. The oil recoveries with different grid numbers (Y-axis is oil recovery rate, %; X-axis is time, s).