Supplementary Material

1 DERIVATION OF THE RATE OF LINEAR GROWTH α

In this section we describe the procedure to obtain the values of the rate of linear growth α reported in Table 1. This parameter is defined by

$$\alpha = \frac{dr}{d\tau} \tag{S1}$$

that according to Eq. (15) takes the form

$$\alpha = \frac{r_0 d}{2\theta} e^{N_p \epsilon_f^* \epsilon / k_B T} \tag{S2}$$

where θ is the saturation time derived from the 2D Avrami expression, given in minutes by $\theta = (1/b)^{1/d}$ with parameters b and d obtained from fitting the Avrami equation, Eq. (11), to experimental data, as described in the main text. The corresponding values of the grains radii r_0 at time θ, as observed from experiments, is of the order of 1-3 millimeters. The data in Table 1 was obtained using $r_0 = 1$ millimeter.

Considering $\phi = 0.36$ as a typical value for the packing fraction for both simulations and experiments, we determined an average value of the activation energy per molecule. This term is calculated using energy contributions from molecules that belong to two different clusters and that are at the borders of these clusters. In this work, the energy value is obtained for a Mie potential system at a 2D packing fraction of $\phi = 0.36$. The assumption here is that the Mie potential is short ranged and that the real interaction between clusters is given by the molecules that are at the perimeter of the clusters. This interaction energy between clusters is averaged over the total number of molecules in each cluster, to obtain an average energy value that can scale to different clusters sizes. The MD value for this energy is $\epsilon_f^* = \epsilon_f/\epsilon = -0.015$, given in terms of the energy scale parameter of the intermolecular potential, ϵ. The total number of spherical segments used in the simulation model for each molecule was $N_p = 43$.

The value in real units for ϵ was derived from the Molecular Thermodynamic biodiesel model for methyl oleate presented by Perdomo and Gil-Villegas (2010). As explained in the main article, biodiesel molecules and triglyceride molecules have the same fatty acids. The triglyceride molecule in our model, observed in Fig. 3, is formed by two units of stearic acid and one unit of oleic acid. The size of the oleic acid residue, linked to one of the three hydroxymethyl residues of the glycerol with a size of 6.5σ, can be compared with the size of the methyl oleate, which is a chain molecule with 5.6693 spheres of diameter 7.5388 Angstroms, *i.e.*, a total length $L = 42.7397$ Angstroms. By a simple equivalence, $6.5\sigma = L$, we obtain $\sigma = 6.5753$ Angstroms. A similar relation is used for the energy parameter, since the total energy of the computer simulation molecular model is 12ϵ, whereas for the methyl oleate system is $1436.8161\ k_B$. The comparison between these energies gives $\epsilon/k_B T = 0.4016$, for $T = 298$ Kelvins.