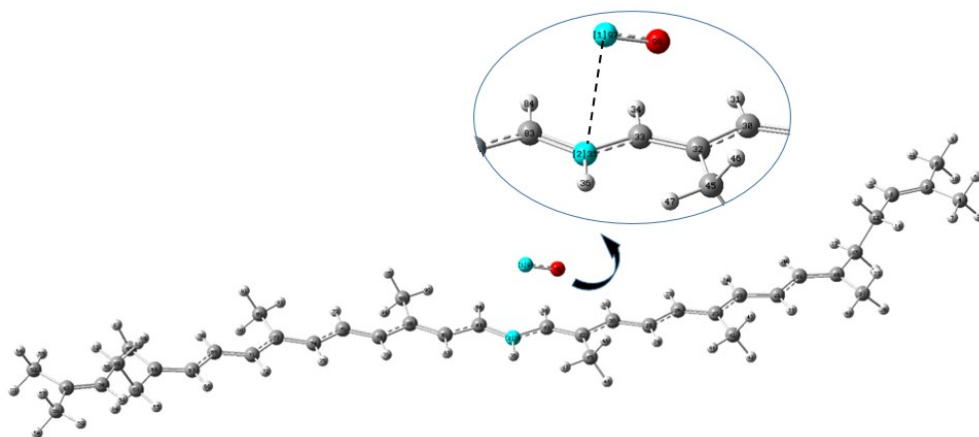


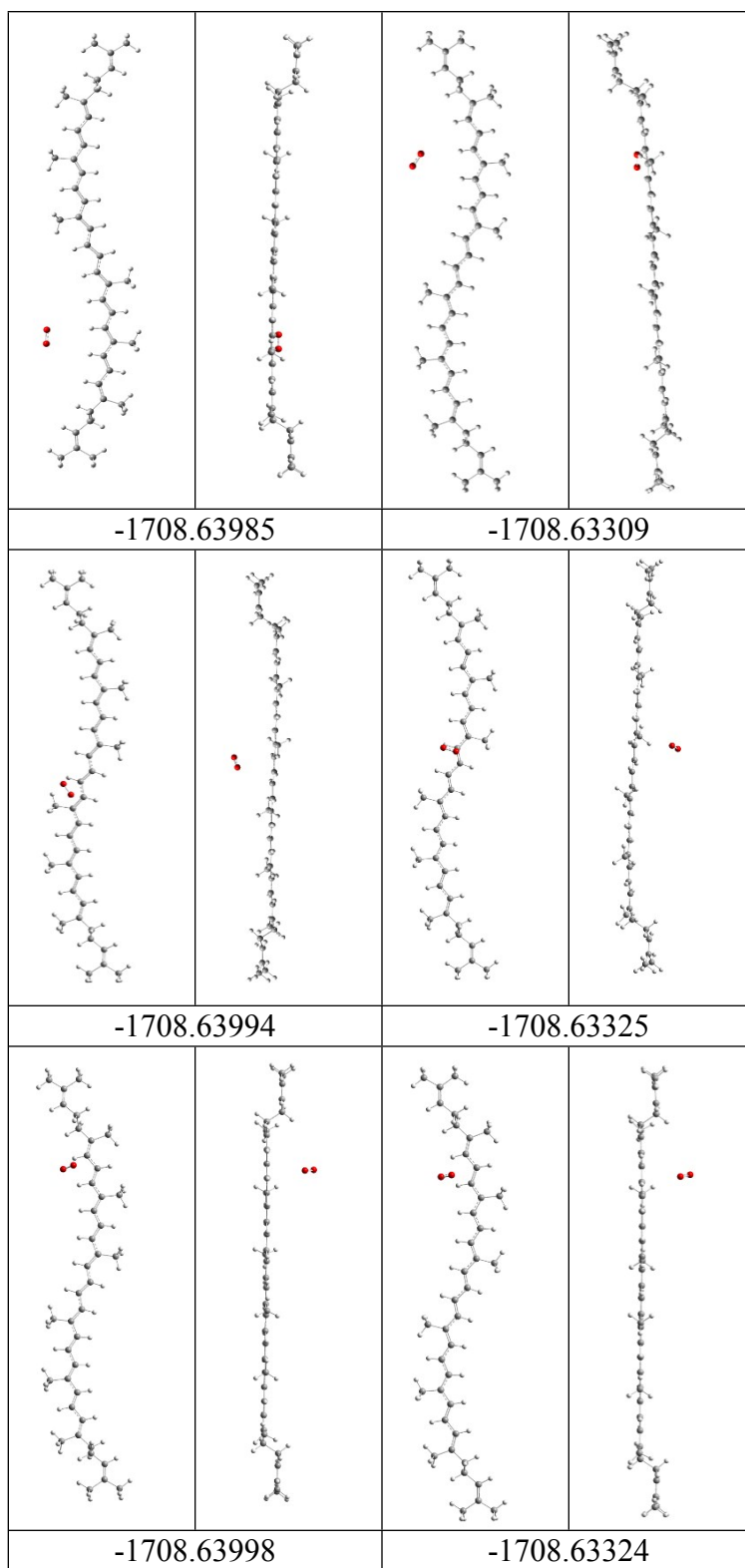
Supporting Information

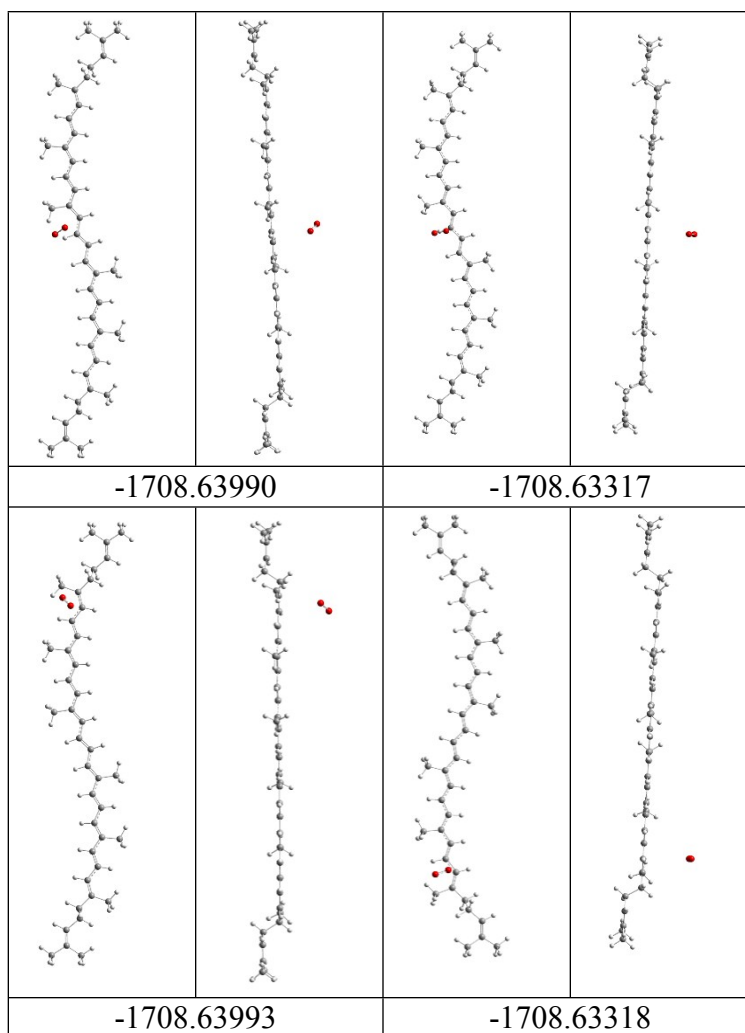
The determination of distance The distance question refers to the distance between oxygen molecule and lycopene molecule. It is the length between 35th carbon atom and the oxygen atom which is closer to it, as is shown in the following picture.



The 12 relative locations Given the locations have a certain symmetry, we just display six different locations and those corresponding energy just as the following Table. And this paper we just select any one of them as the representative for analysis. (the unit of energy is Hartree)

SO---Lyco		TO---*Lyco	
plan	top	plan	top
-1708.63987		-1708.63308	

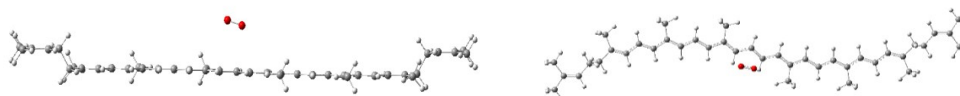




The configurations corresponding to 3.2, 2.15, and 4.3 Å The configurations

corresponding to 3.2, 2.15, and 4.3 Å are just like the following Table.

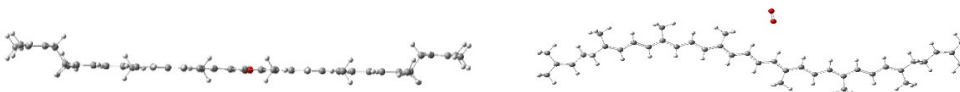
3.2Å



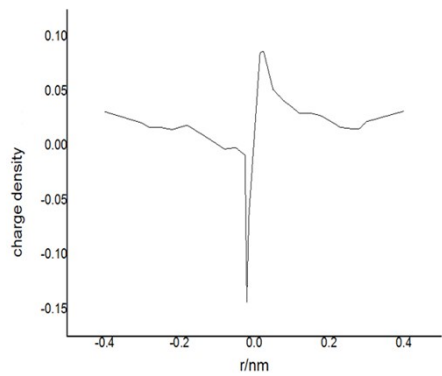
2.15Å



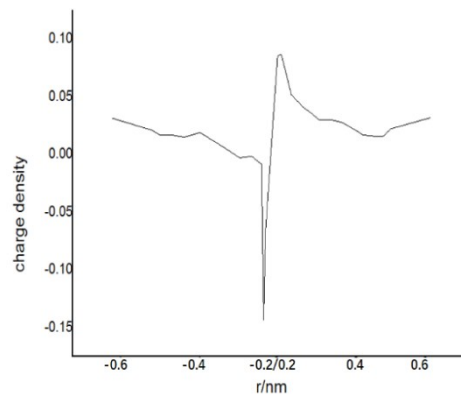
4.3Å



The disposal of Figure 8



Radical diagram



Processed diagram