Table A: list of notations used in the manuscript

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| **Variable** | **Definition** | **Unit** |
|  | Surface area between FAMEs and atmosphere |  |
|  | Vector of species concentration | - |
|  | Concentration of species s without co-oxidation |  |
|  | Concentration of species s with co-oxidation |  |
|  | Diffusion coefficient of the molecules involved in reaction X |  |
|  | Activation energy |  |
|  | Reaction rate constant |  |
|  | Vector of reaction rate constants | - |
|  | Interfacial mass transfer coefficient of oxygen |  |
|  | Avogadro constant |  |
|  | Dynamic viscosity of FAMEs |  |
|  | Partial pressure of oxygen in the atmosphere in contact with sample |  |
|  | Radius of gyration of the molecules involved in reaction X |  |
|  | Hydrodynamic radius of molecules involved in reaction X |  |
|  | Gas constant |  |
|  | Stoichiometry matrix | - |
|  | Solubility coefficient of oxygen in FAMEs |  |
|  | Oxidation temperature |  |
|  | Absolute temperature |  |
|  | Reference temperature |  |
|  | Volume of FAMEs |  |
|  | Molar volume of FAMEs |  |
|  | Cross-termination parameter between radicals i and j. | - |
| **Subscripts** | **Definition** | - |
|  | Reaction of oxygen addition | - |
|  | Reaction of hydrogen abstraction by alkoxyl radical | - |
|  | Reaction of hydrogen abstraction by hydroxyl radical | - |
|  | Reaction of beta-scission | - |
|  | Reaction of hydroperoxide decomposition | - |
|  | Index to identify the FAMEs | - |
|  | Reaction of hydrogen abstraction by peroxyl radical | - |
|  | Species | - |
|  | Reaction of termination between peroxyl radicals | - |
|  | Reaction of termination between alkyl radicals | - |
|  | Reaction of termination between alkyl and peroxyl radicals | - |
| **Superscripts** | **Definition** | - |
|  | Diffusion controlled reaction | - |
|  | Smoluchowski limit | - |