

## Supporting Information

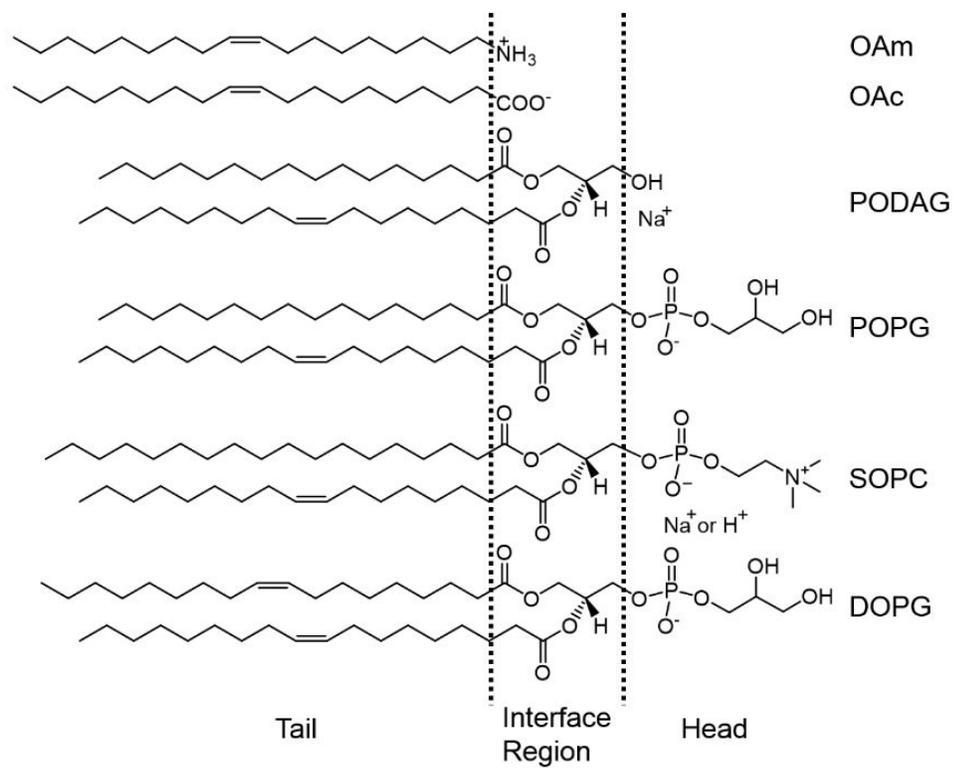
### Subtle Changes in Lipid Environment Have Profound Effects on Membrane Oxidation

#### Chemistry

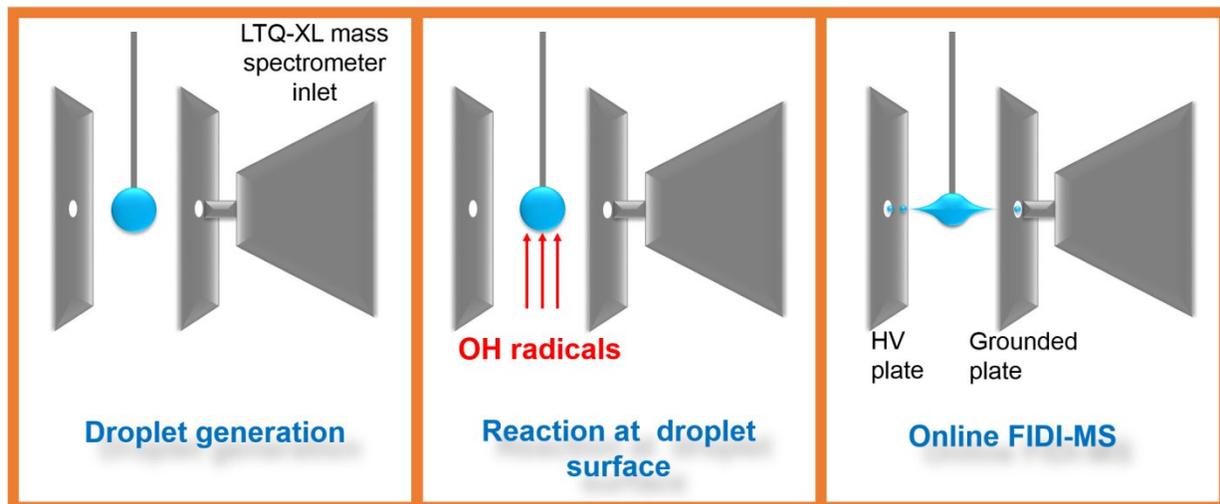
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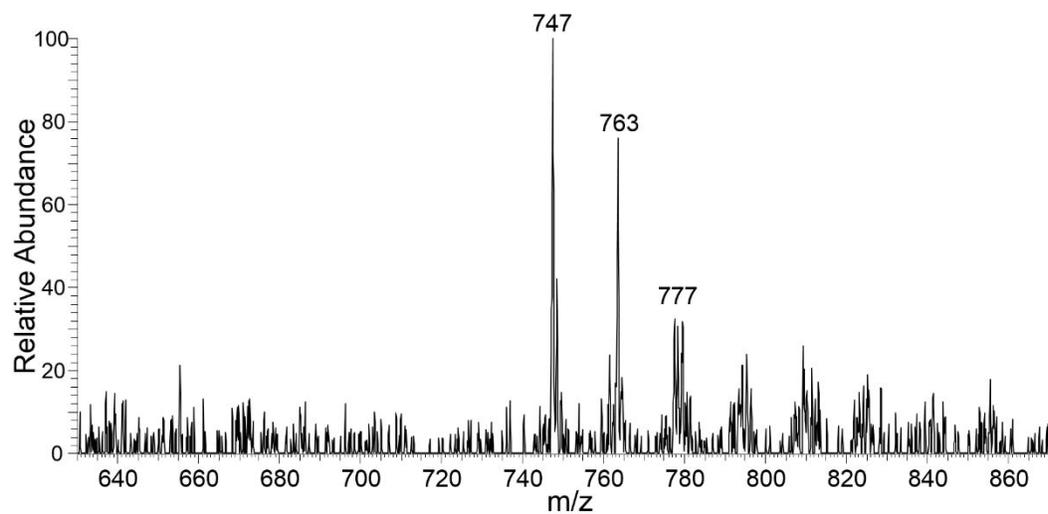
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**Figure S1.** Structures of the six molecules studied in this work and their relative positions at the air-water interface.



**Figure S2.** Schematics of the FIDI-MS setup.



**Figure S3.** FIDI-MS spectrum of OH oxidation of 1  $\mu$ M POPG solution for 60 s, where only addition chemistry is observed.