Supporting Information

Enhancing the Selectivity of Hydrocarbons during the Kolbe Electrolysis of Biomass-derived Short-chain Carboxylic Acids by Anionic Surfactants

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The hydrophilicity analysis of the Pt electrode

Water contact angle tests of the Pt electrodes were conducted using a JC2000D1 Contact Angle apparatus equipped with a CCD camera (Shanghai Zhongchen Digital Technic Apparatus Co. Itd, China). All measurements were conducted at ambient pressure and room temperature (20-25^{o}C). A 2.0 μL droplet of butyric acid solution (H-Bu, 1.0 mol/L) or acetic acid solution (H-Ac, 1.0 mol/L) was dripped onto the surface of each Pt electrode at three different points, and each droplet was allowed to settle for 30 seconds before taking the water contact angle measurement. The POWEREACH®V2.11 Analyzer software was used to measure the average contact angle. Generally, a water contact angle less than 90° is considered as a hydrophilic surface, and the contact angle increases with the surface hydrophobicity of the Pt electrode.

Evidence of SDS-modification is presented in Figure S1, which shows static contact angles of *n*-butyric acid (H-Bu) and acetic acid (H-Ac) solution with respect to the surfaces of Pt electrodes. The magnitude of contact angle increase is the greatest for the butyric acid solution on the surface of the SDS-modified Pt anodes (reacted at J=100mA/cm^2 for 110 min). The increase in contact angle is due to incorporation of the relatively more hydrophobic SDS onto the Pt anodes, which suggests that the external electrode surface sites are initially heterogeneously covered with the SDS during the Kolbe reaction. However, for the Pt anodes reacted without SDS, the contact angles decrease a little for *n*-butyric and acetic acid solution, which may be rich of the hydrophilic hydroxyl groups on the electrode surfaces.

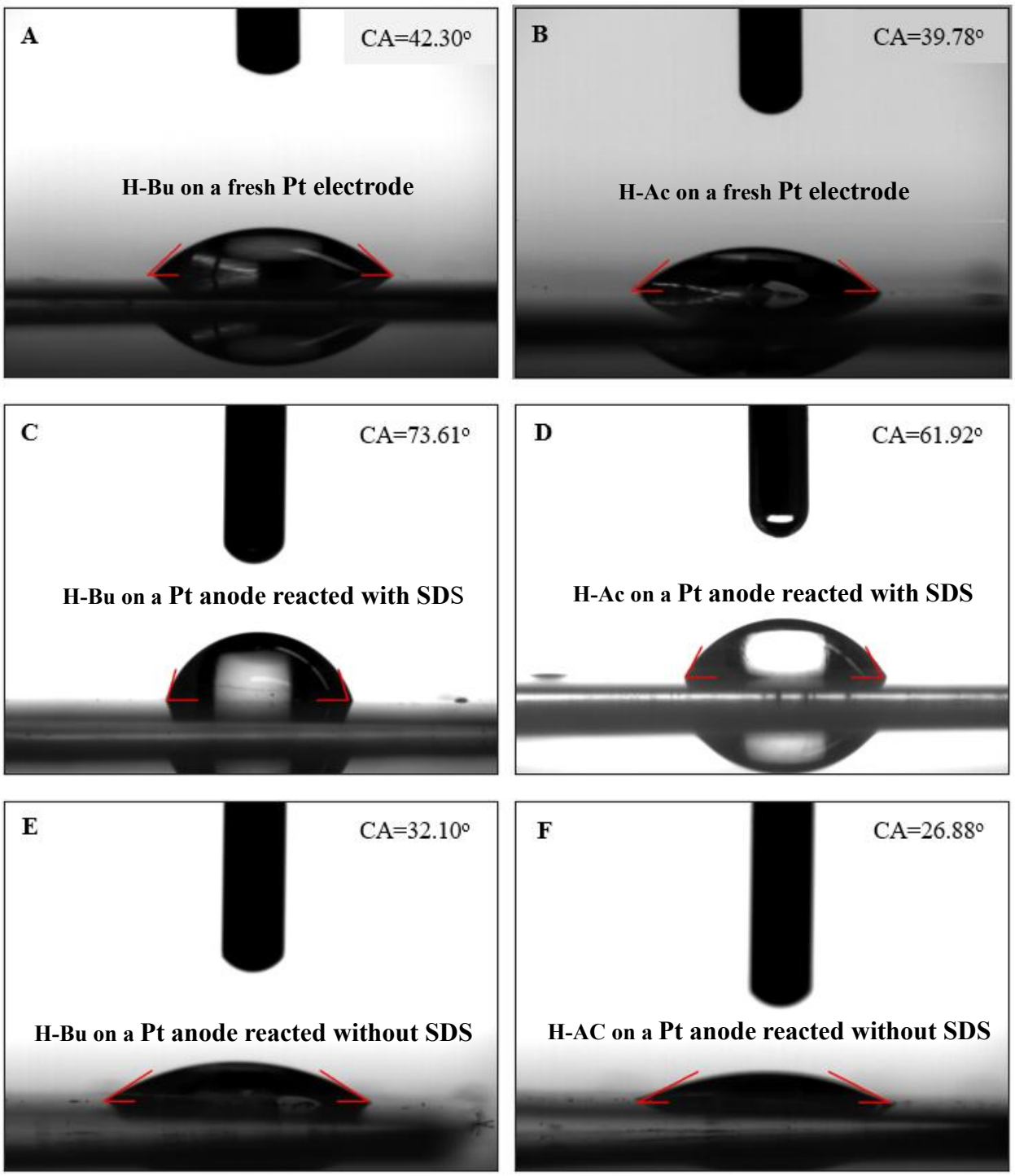

Figure S1 Static surface contact angle micrographs of Pt electrodes with butyric acid and acetic acid solutions