Fountain Pen for Scanning Electrochemical Microscopy

-- Electronic Supporting Information --

Fernando Cortés-Salazar[a], *Andreas Lesch*[b], *Dmitry Momotenko*[a], *Jean-Marc Busnel*[a], *Gunther Wittstock*[b] *and Hubert H. Girault*[a,*].

[a] Laboratoire d'Electrochimie Physique et Analytique, Ecole Polytechnique Fédérale de Lausanne, Station 6, CH-1015 Lausanne, Switzerland.

[b] Department of Pure and Applied Chemistry, Center of Interface Science (CIS), Faculty of Mathematics and Natural Sciences, Carl von Ossietzky University of Oldenburg, D-26111 Oldenburg, Germany.

[*] CORRESPONDING AUTHOR FOOTNOTE

EMAIL: hubert.girault@epfl.ch

Telephone number: +41-21-693 3145

Fax number: +41-21-693 3667

S1: Fountain pen photographs.

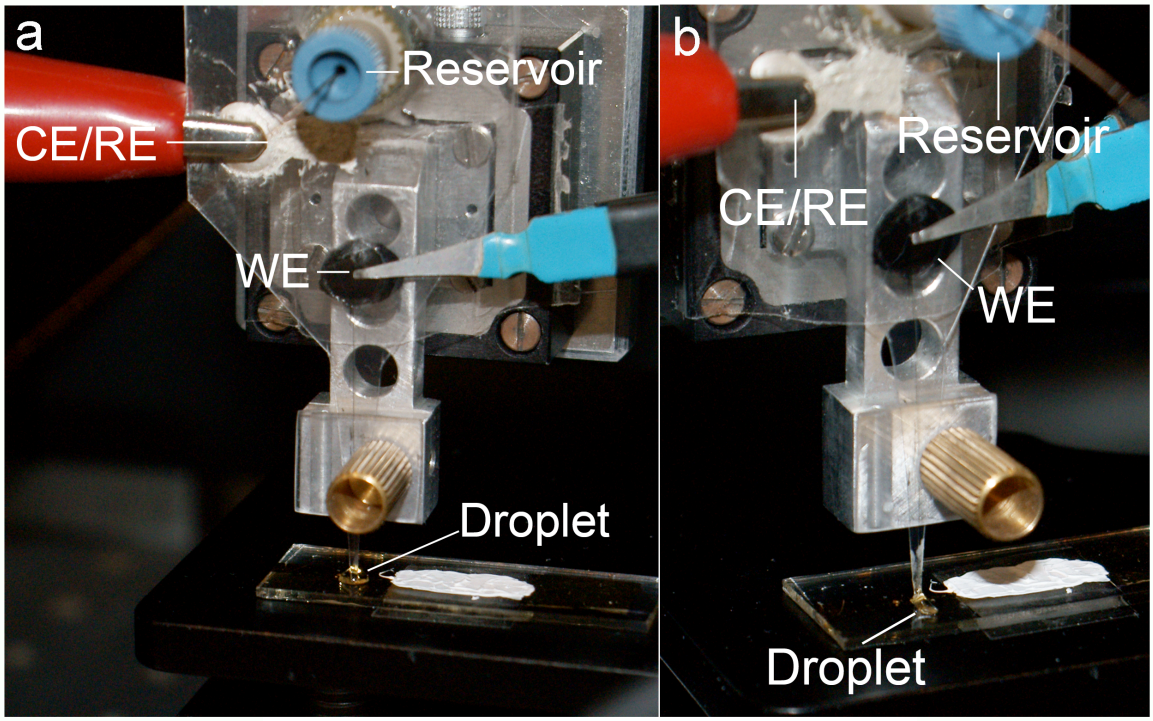

Figure S1. Photographs of the fountain pen probe working in a) pointillist and b) scanning mode.

S2: Working distance of the *unbent* and *bent* fountain pen probes.

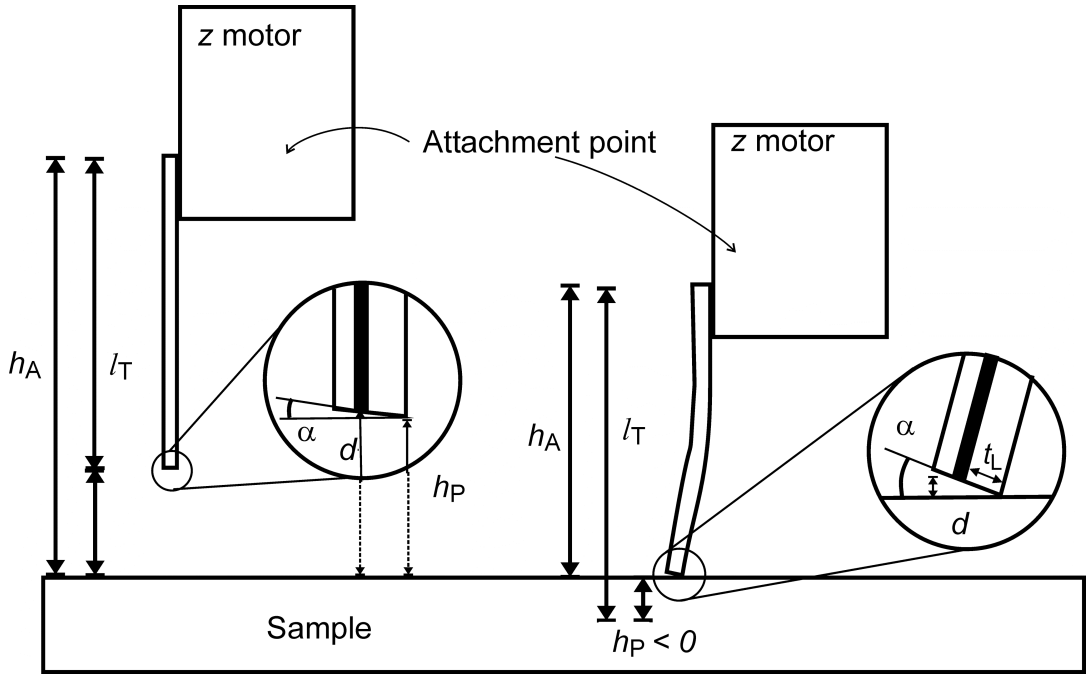

Figure S2. Schematic representation of the SECM contact mode and the working distance for unbent and bent fountain pen probes.

If the probe is pressed against the substrate, it bends. In this way after contact, *d* does not vary linearly with the movement of the mechanical positioning system. For this reason, we shall define h_A as the height of the attachment point of the soft stylus probe with respect to the sample surface, which varies linearly with the *z* position of the positioning system. If l_T is the length of the probe in the unbent state, the substrate-electrode distance *d* that is always positive differs from the quantity $h_P = h_A - l_T$ that can assume negative values when the probe is pressed against the substrate. The situation is shown in Figure S2. After contact, the polished front end of the probe forms an angle α to the sample surface that increases upon further bending of the probe. Thus *d* is completely defined by $d = h_P + t_L \cdot \sin(\alpha)$, where t_L is the thickness of the polymeric film that is between the sample surface and the carbon electrode.