Flow electrification investigated under the effect of the wall shearing stress

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***Abstract* — When a liquid is in contact with a solid, a physicochemical reaction occurs at the solid/liquid interface leading to the formation of the electrical double layer. Whenever the mobile portion of this charge inside the liquid is swept by the flow, a chemical disequilibrium occurs and leads to the flow electrification process. According to the classical theory of this phenomenon, it is assumed that the laminar flow parameters has no impact on the chemical behavior at the interface. Therefore, the static equilibrium (without flow) and the dynamic one (with flow) for the fully developed double layer is supposed identical. However, recent studies have shown that this supposition is not consistent with the experimental results. The aim of this work is to highlight the impact of the wall shearing stress on the flow electrification phenomenon in the case of mineral oil flows through a stainless steel capillary. In this purpose, the capillary is shortened to keep the same contact duration between the solid and liquid at different flow velocities.**