

INTERNSHIP PROPOSAL

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Thesis possibility after internship: Possibly
Funding: YE If YES, which type of funding: Industrial
(Saint Gobain Research Paris)

Friction and elasticity during the deposition of polymer films on glass substrates

Summary

The production of laminated glass for windscreen involves a preliminary stage where a solid polymer film of Poly(vinyl butyral) (PVB) is deposited on flat glass. This is carried out by a process in which the film is unrolled onto a translated glass plate (Fig. 1a). During this stage, it is crucial that the film does not form wrinkles that could lead to optical defects after the laminating process. Preliminary studies indicate that the trapping of wrinkles depends on the friction conditions between the film and the glass which involve the roughness of the PVB film and the elastic energy stored in the wrinkles.

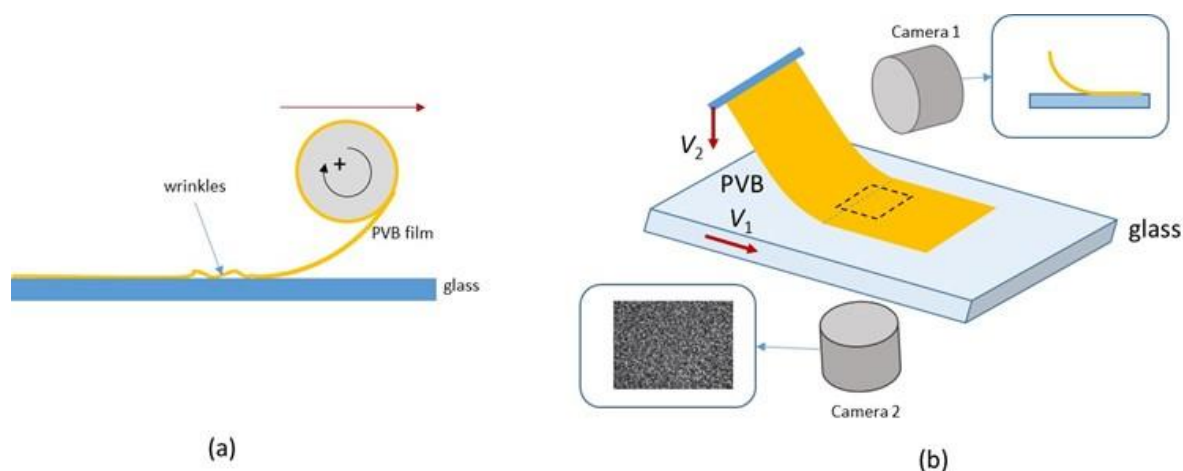


Figure 1 : Deposition of a PVB film on a glass substrate. (a) Schematic of the industrial process; (b) Experimental set-up with imaging of the shape of the PVB strip and of the multi-contact interface.

What are the links between film deformation, friction and the occurrence of slippage at the contact line? What is the contribution of film roughness? To answer these questions, we will carry out experiments in which a rough PVB strip is deposited in a controlled manner on a glass plate in translation at an imposed speed (Fig. 1b). Visualization will enable us (i) to follow the deformation (curvature) of the strip during deposition (ii) to determine the contact conditions at the glass/PVB interface. Based on these observations, we will seek to develop a description of the role of friction in the formation and trapping of wrinkles.

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics:	YES	Soft Matter and Biological Physics:	YES
Quantum Physics:	NO	Theoretical Physics:	NO