Contribution ID: **573** Type: **Oral Presentation**

Phase-field modelling of bulk-surface PDEs and adhesive interfaces

Wednesday, 2 June 2021 15:30 (15 minutes)

In a wide range of porous media applications, the evolution of material boundaries is driven by complex processes at the interface such as biofilm growth and surfactant dynamics, or between two interfaces such as adhesion. To describe and understand these multi-phase and bulk-surface interactions we make use of phase-field modelling. Within this framework, we will present a new and thermodynamically-consistent model for adhesion, for instance between one of the fluid phases and a non-moving porous medium. A coupling term is introduced into the free energy to account for the adhesive interaction. The resulting adhesion model is a stiff, higher-order, non-linear partial differential equation, which needs to be solved using an energy-stable time-integration scheme. In addition, to further incorporate interfacial dynamics, e.g. those in biofilm growth, a surface partial differential equation can be solved using the diffuse interface approach. In this contribution, we will discuss the underlying foundations of our model in terms of thermomechanical consistency and present some preliminary numerical results-oriented towards porous media applications.

Time Block Preference

Time Block B (14:00-17:00 CET)

References

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