

Abstract Submitted
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Dynamics of clogging in drying porous media¹ C. NADIR KAPLAN,
L. MAHADEVAN, Harvard University — Drying in porous media pervades a range
of phenomena from brine evaporation arrested in porous bricks, causing efflorescence,
i.e. salt aggregation on the surface where vapor leaves the medium, to clogging of
reservoir rocks via salt precipitation when carbon dioxide is injected for geological
storage. During the process of drying, the permeability and porosity of the medium
may change due to the solute accumulation as a function of the particle concen-
tration, in turn affecting the evaporation rate and the dynamics of the fluid flow
imposed by it. To examine the dynamics of these coupled quantities, we develop a
multiphase model of the particulate flow of a saline suspension in a porous medium,
induced by evaporation. We further provide dimensional arguments as to how the
salt concentration and the resulting change in permeability determine the transition
between efflorescence and salt precipitation in the bulk.

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C. Nadir Kaplan
Harvard University

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