

# The Fate of Thixotropy in Hydrogels

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## Introduction

Thixotropy is one of the oldest documented rheological phenomena in colloid science even if a general rheological model capable of fully describing the different features of thixotropy has not yet been developed (Barnes 1997). One of the many definitions of thixotropy is reported by Oxford Encyclopedic Dictionary of Physics, “*Thixotropy: Certain materials behave as solids under very small applied stresses but under greater stresses become liquids. When the stresses are removed the material settles back into its original consistency*” (Thewlis 1962).

In 1923, Schalek and Szegvari showed that aqueous iron oxide gels have the remarkable property of becoming completely liquid through gentle shaking alone, to such an extent that the liquified gel is hardly distinguishable from the original sol (Schalek and Szegvari 1923). This characteristic is the basis for the explanation made by Garlaschelli et al. of the famous S. Gennaro miracle in Naples (Garlaschelli et al. 1991). In that case, the Cardinal of Naples applies a shear stress, in the typical blood-liquefaction ceremony; the act of checking whether liquefaction has occurred comprises of repeatedly inverting the glass-walled portable relic case (Fig. 1). Normally our approach to this kind of a

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