

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Role of interaction in the formation of memories in paste AKIO NAKAHARA, YOUSUKE MATSUO, Nihon University — A densely packed colloidal suspension with plasticity, called paste, remembers the directions of vibration and flow. These memories in paste can be visualized by the morphology of desiccation crack patterns. We investigate the role of interaction in the formation of memories in paste. First, interparticle attractive forces, such as van der Waals interaction, are needed to construct a macroscopic network structure with plasticity. With the help of attractive interaction, a water-poor paste remembers the direction of vibration and a water-rich paste remembers the flow direction [1]. When particles are charged in water, however, Coulombic repulsive interaction prevents formation of dilute network structure under flow, which leads to the experimental result that a water-rich charged paste cannot remember flow direction. Addition of sodium chloride to such a paste gives the ability to remember flow direction due to the screening effect of Coulombic repulsive interaction between particles [2].

[1] A. Nakahara, Y. Shinohara and Y. Matsuo, J. Phys.: Conf. Ser. 319 (2011) 012014.

[2] Y. Matsuo and A. Nakahara, arXiv:1101.0953v1 [cond- mat.soft].

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Date submitted: 22 Sep 2011

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