

# Bibliography On Size Exclusion Chromatography (gel Permeation Chromatography), 1979-1982

PEER-REVIEWED ARTICLE

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## Effect of Fixing Agent Dosage on the Mechanism of Colloidal Substances Retention onto Pulp

Lijun Wang,<sup>a,b,c,\*</sup> Yiqian Zhang,<sup>a</sup> Hui Chen,<sup>a</sup> Xing Xia,<sup>a</sup> Zehua Liu,<sup>a</sup> and Zhijun Hu<sup>b</sup>

Three polyamine fixing agents with increasing molecular weights (m.w.), PA-Lw, PA-Mw, and PA-Hw, were used to treat a deinked pulp at three different levels of chemical dosage. The objective was to elucidate whether the retention mechanism of colloidal substances (CS) onto fibers by a fixing agent is different when the dosage is different. The results show that, for the polyamine with the lowest molecular weight (PA-Lw), it performed in the colloidal fixation mode over a wide range of dosage, but re-dispersion of CS took place in the pulp when its dosage was increased to a level high enough but still beneath the charge reversal point. For the polyamine with the highest m.w. (PA-Hw), CS re-dispersion was not observed over the whole dosage range, but a small part of the colloidal agglomeration coexisted with colloidal fixation even when the dosage was very low. For the polyamine with the middle m.w. (PA-Mw), both CS re-dispersion and colloidal agglomeration were observed. This study showed that if one wants to determine the dosage of a fixing agent during CS control better, both CS removal ratio and CS agglomeration behavior should be considered.

**Keywords:** Fixing agent; Polyamine; Dissolved and colloidal substances; Agglomeration; Fixation; FBRM

**Contact information:** a: Tianjin Key Laboratory of Pulp and Paper, Tianjin University of Science and Technology, Tianjin, 300457, China; b: Department of Light Chemical Industry, Zhejiang University of Science and Technology, Hangzhou, 310023, China; c: Hangzhou Qianjiang Distinguished Experts Station, Zhejiang Yongtai Paper (Group) Industry Co. Ltd., Fuyang, Hangzhou, Zhejiang, 311421, China; \* Corresponding author: wanglijun@zust.edu.cn

### INTRODUCTION

Due to the increasing use of recovered fibres and high yield pulps, and the adoption of fully whitewater recirculating systems in the wet-end of a modern papermaking system, high concentrations of dissolved and colloidal substances (DCS) are often accumulated in white water, and these may cause severe pitch and stickies deposit problems. Polymeric chemicals, called fixing agents or fixatives and usually having high cationic charges and relatively low molecular weights, are often used to neutralize the negative charges of the DCS components and "fix" them onto fibers. As a result, the DCSs are removed out of the system as a part of the paper product, and deposit problems are greatly alleviated. Typical fixing agents include the polyamines (PAs), polyvinylamines (PVams), polydimethyldiallylammonium chlorides (PDADMACs), polyethyleneimines (PEIs), and specially-made highly cationic starches (Neimo 1993; Allen and Filion 1996; Esser *et al.* 2001; Yu *et al.* 2003; Maher *et al.* 2007; Miao *et al.* 2013). However, the term "fixing agent" or "fixation" has actually not been well defined. One simple example is when a fixing agent is dosed to a pulp and interacts with colloidal substances, it remains unclear whether the colloidal particles are fixed onto the fiber in a form where they retain their original single particle state, *i.e.*, the so-called "colloidal

Wang *et al.* (2014). "Fixative molecular weight." *BioResources* 9(2), 3225-3235. 3225

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