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Particles, Water, and the Mathematics of Conservation

ABSTRACT

The history and practice of the deacidification of books, documents, and works of art on paper offer many case studies of conservation treatments that use liquids to impregnate particles and molecules into or wash them from paper. This report considers the results from well-known aqueous, non-aqueous, and gaseous treatments from a new perspective, that is, by comparing their particle size and moisture interactions to the protection they provide against aging, their neutralizing power and the surface defacement they cause. The findings offer strong evidence why the optimization of conservation treatments require more attention to both treatment conditions and long-term storage environments than conservators presently practice.

One application of this perspective is the development of a new family of deacidification sprays and solutions by Wei T'o Associates. Others are explanations for different types of surface defacing deposits produced by solvent treatments, e.g., on dense or coated papers, and by the FMC-Lithco process. The mathematics underlying this work appears to (1) have wide-spread applications to the design of conservation treatments that use solvents to add and/or remove substances from artifacts and (2) offer technology insights that may lead to further progress and advances in the science of conservation.

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