

**Research Institute:**

PTS Heidenau  
Pirnaer Str. 37  
01809 Heidenau

**Head of the research institute:**

Prof. Dr. Frank Miletzky

**Project leader:**

Marcel Haft  
Tel: 03529 / 551-661  
Fax: 03529 / 551-889  
E-Mail: [marcel.haft@ptspaper.de](mailto:marcel.haft@ptspaper.de)

Internet: [www.ptspaper.de](http://www.ptspaper.de)

**Research area: Process aims**

Converting // Coating

**Key words:**

Electron beam, radical chemistry, Polymers, Coating, Surface treatment

**TITLE:**

**Application of electron beam procedure for modification of aqueous synthetic polymer dispersions for reduction of the use of binder in standard and special paper coatings.**

**Background/Problem area**

The coating of paper and board is adding a substantial value to the product and induces several functionalities. A coating color, depending on the desired properties of the product consists mainly of pigment particles. These particles are connected to the paper surface and among each other via a polymeric binder. To adjust properties like viscosity and water retention as well as opacity and whiteness, one can use numerous additives like optical brighteners, co-binder, thickener or rheological modifiers. To meet the requirements of such coating colors one has to use specialized binders or has to stabilize binders with e.g. defoaming agents which in conclusion raises prizes. Target of this research project is now to modify cheap and simple polymeric binders with certain molecules via electron beam technique in order to obtain the same properties as for expensive special binders.

**Objectives/Research results**

In this research project we want to modify different standard polymeric binders with two different kinds of modifiers. Via grafting to approach the polymer latices will be functionalized with molecular substances (glucose, PVP, silicones) as well as with other polymeric compounds.

In this context it should be possible to introduce an enhanced hydrophilicity or even hydrophobic surface properties into the polymeric binders. It is then thinkable that the modified binders are used in barrier coatings or in coating for enhancing the printability.

To do so, an electron beam radiation facility is built. Using powers of more than 10 MeV it is possible to irradiate the samples even in substance (up to 7 cm thickness). The target is now to test the influence of the dosage to the polymeric binders in order to pick the best candidates. After that we have to find the best substances for modification and the suiting parameters for the irradiation. In a next big step the modified binders have to be used in a coating color and applied onto paper substrates. The barrier and printability properties have then to be tested and evaluated in relation to standard samples.

**Application/Economic benefits**

The modification via electron beam has the advantage that no critical side products emerge. For companies it is possible to obtain different specialized binders by modifying a standard polymeric dispersion with various molecules. Using the modified binders it should be possible to reduce the amount of binder to obtain the same properties in barrier or in jet printability coating. In this context one saves pigments and additives too, which yields to a significant reduction of costs. Besides saving money, for supplier industry it is possible to hit new markets with such electron beam modified binders. Especially in the field of barrier coatings and an improved printability for folding board boxes EB-modified binders are promising.

**Period of time: 01.01.2016 – 30.06.2018**

**Remarks**

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