

Badanie czynników wpływających na wytrzymałość połączeń klejowych wkładów książek

Investigation of influencing factors on the strength of adhesive binding of book blocks

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Przeanalizowano wpływ czynników na wytrzymałość strukturalną i trwałość związków adhezyjnych w grzbietach wkładów książek. Na podstawie analizy różnicowo-termicznej, rentgenowskiej i mikroskopowej klejów termotopliwych i papieru, z którego wykonano wkłady książkowe, zbadano ich strukturalną budowę oraz współdziałanie fizykochemiczne na poziomach makro- i mikropodstawowych, zmodelowano osobliwości tworzenia połączeń klejowych.

Słowa kluczowe: książki, kleje topliwe, dyfraktogramy, mikroskopia, papier, struktura, wytrzymałość połączeń klejowych

It was analyzed the influence of factors on the structural strength and durability of adhesive compounds in the roots of the book blocks. On the basis of differential-thermal, X-ray structural and microscopic analysis of hot-melt adhesives and paper, from which book blocks are made, it was investigated their structural build and physical-chemical interaction at the macro and micro levels, the features of the formation of adhesive compounds were revealed.

Keywords: books, hot-melt adhesives, diffractograms, microscopy, paper, structure, strength of adhesive compounds

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Introduction

Despite the rapid development and popularity of the e-book, classical print media remain competitive on the market. A typical trend of the present for the production of book products is the combination of digital printing technology and perfect binding, in particular for books on demand (Binding on Demand), which is observed in many developed countries of Western and Eastern Europe, the USA, Japan, China, etc. Therefore, the technology of perfect binding of book and magazine products attracts the attention of many scientists to study the physical and mechanical properties of elements of adhesive compounds; study the adhesion processes and disclosing the adhesion mechanism of glue and paper; prediction of durability of adhesive compounds and finished editions [1-7]. It is known that the thickness of the adhesive film has a significant effect on the strength of the connection. When thickness decreases, strength increases to some extent. The optimum amount of adhesive gap lies within 0.4-1.5 mm. It was investigated that the strength and durability of adhesive compounds depends on the strength of the so-called adhesive seam and the cohesion strength of the connecting elements, therefore, for the calculation of the adhesive connection, the relationship between the modulus of elasticity and the limits of strength of the paper and adhesives used to binding the book blocks should be taken into account. The conducted researches indicate the existence of unexplained static bonding problems with the use of modern polymeric adhesive compositions. The gluing area in the system