



THIN FILMS, MEMBRANES, FUNCTIONAL MATERIALS AND PROCESSING TECHNOLOGIES

**EDITED BY
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Duc Hoa Nguyen

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Special topic volume with invited peer-reviewed papers only

Edited by

**Mykola Surianinov, Wanlop Kitisatorn, Bima Prihasto
and Duc Hoa Nguyen**

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Preface

This special edition is dedicated to cutting-edge research and developments across diverse fields of materials science. The articles reflect the multifaceted nature of research, which bridges traditional and innovative approaches and drives progress in modern materials engineering.

The advanced characterisation techniques and processing methods that enhance the mechanical and functional properties of steels and alloys are explored in the articles of the first chapter. These insights are essential for applications ranging from construction to aerospace engineering.

The second chapter focuses on the design, synthesis, properties analysis, and application techniques of polymeric and composite materials. This chapter emphasises the role of polymers and composites in high-performance applications.

Chapter 3, Functional Materials, delves into materials with unique electrical, semiconductor, and optical properties, highlighting their transformative potential in electronics, energy, and sensing technologies.

Chapter 4, Thin Films and Membranes, examines the synthesis, characterisations, and tools for thin film characterisation and application of membranes in areas such as energy storage, water filtration, etc. These materials are pivotal in addressing challenges in energy efficiency and environmental sustainability.

The breadth of topics covered in this collection underscores the vital role of materials science in shaping our technological future. We hope that this special edition will serve as an inspiration and resource for researchers, practitioners, and students eager to advance the frontiers of this dynamic field.

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Contact – Condensation Binders Containing in Polymers

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Keywords: water – resistant polymer, contact-condensation binders, ecological safety, adsorption, Polivinyle acetate dispersion.

Abstract. The current paper focuses on the processes which bring about the formation of water – resistant polymer – containing film coatings based on contact – condensation binders. With the aid of complex physical – chemical investigations, the interactions in the polymer silicate systems and especially those which are stipulated by the structure state of silicates have been studied. These silicates are represented by highly – dispersed, amorphous or sub- microcrystalline phases. Established that, the properties of coatings, namely, increased water and atmospheric resistance, are determined by formation of chemical bonds in the system “Polyvinylacetate-calcium silicate hydrate”. Exposed the differences in the processes of structure formation, depending on the special features of the mineral components. The interaction activity of calcium silicate hydrates, to a certain extent is higher than for the unhydrous analogues of the stable crystalline structure. Presented the experimental results of the developed contact – condensation binders for composite materials based on industrial waste products, particularly, red bauxite slime. Therefore, the technological processes for production such binders are based on the methods which enable to synthesize materials with the given structural features. Hence, the present research is directed to the development of new-white and coloured painting materials.

1 Introduction

It is well known, that the determining property, of contact – condensation binders, consist of their capacity to form a water-resistant material either during mechanical convergence of macroparticles or spontaneous mobilization of water coupled with the conversation of the chemical constituent of the hydrated phases [1]. This group is related to the organic-mineral binders [2], whereby chemical interaction is conductive between hydrates and salts of the fatty acids in the dispersion state, with subsequent development of process under cramped conditions thus enhancing the formation of a water – resistant body. In fact, the mechanism of contact and hydrated hardening are realized in a sequence for such systems.

That's why, in order to extend the of the use of minerals, of contact - condensation binders, represented by dispersed calcium silicate hydrates of unstable crystal structure, the processes accompanying the formation of water - resistant coating films from silicate polymers, have been studied. First of all such materials have been used for the achievement and decoration building paint.

2. Main Part

Materials and methods. The chemical composition of the raw materials used in order to obtain calcium silicate hydrate (CSH) is given in Table 1.

Table 1 The four quadrants of the business ethics matrix

	High ethical standards	Low ethical standards
High ethical standards	<p>High ethical standards and high ethical standards: This quadrant represents the ideal state of affairs, where a company not only has high ethical standards but also adheres to them. This is the most desirable outcome for a company and its stakeholders.</p>	<p>High ethical standards and low ethical standards: This quadrant represents a company that has high ethical standards but does not adhere to them. This is a common occurrence, where a company's values and principles are not reflected in its actions.</p>
Low ethical standards	<p>Low ethical standards and high ethical standards: This quadrant represents a company that has low ethical standards but adheres to them. This is a less desirable outcome, where a company's values and principles are not reflected in its actions.</p>	<p>Low ethical standards and low ethical standards: This quadrant represents the worst state of affairs, where a company has low ethical standards and does not adhere to them. This is the most undesirable outcome for a company and its stakeholders.</p>

These quadrants of business ethics matrix are used to assess the ethical performance of a company. The matrix is based on two dimensions: the company's ethical standards and its adherence to these standards. The matrix is used to identify the areas where a company is performing well and the areas where it needs to improve. The matrix is also used to compare the ethical performance of different companies.

The matrix is a useful tool for assessing the ethical performance of a company. It provides a clear and concise way to compare the ethical performance of different companies. The matrix is also a useful tool for identifying the areas where a company needs to improve.

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Business Ethics Matrix

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Fig. 1 The Business Ethics Matrix. Source: Adapted from the Business Ethics Matrix developed by the author

The purpose of this study was to explore the experiences of students who had completed the course and to determine if there were any differences in their perceptions of the course and their learning experiences. The study was conducted using a qualitative approach, and the data were analyzed using content analysis. The results of the study indicated that students who had completed the course had a more positive perception of the course and their learning experiences compared to students who had not completed the course. The study also identified several factors that influenced students' perceptions, including the quality of the course content, the quality of the instruction, and the quality of the student-teacher relationship.



Fig. 1. Percentage of students who completed the course and their perception of the course. The chart shows that a higher percentage of students who completed the course were satisfied with the course compared to those who did not complete the course.

The results of the study also indicated that students who had completed the course had a more positive perception of their learning experiences compared to students who had not completed the course. The study also identified several factors that influenced students' perceptions, including the quality of the course content, the quality of the instruction, and the quality of the student-teacher relationship. The study suggests that the course was well-received by students and that the learning experiences were positive. The study also suggests that the course was well-structured and that the instruction was of high quality. The study also suggests that the student-teacher relationship was positive and that the students felt supported and encouraged throughout the course.

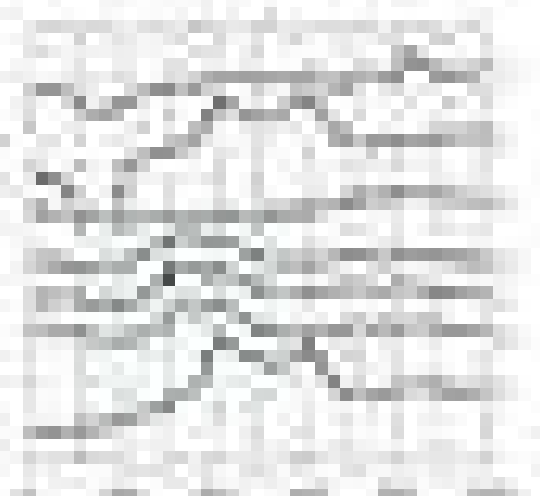


Fig. 2. Percentage of students who completed the course and their perception of the course over time. The graph shows that the percentage of students who completed the course and were satisfied with the course increased over time, while the percentage of students who did not complete the course and were dissatisfied with the course decreased over time.

students' perceptions of their own learning and the quality of their learning experiences.

The study was conducted in a large, public university in the United States. The study was a quasi-experimental design, with two groups of students. The first group was the control group, and the second group was the experimental group. The control group was made up of students who were not enrolled in the course, and the experimental group was made up of students who were enrolled in the course. The study was conducted over a period of 12 weeks.

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Figure 1: Comparison of the two groups' learning experiences over time.

The results of the study showed that the experimental group had significantly higher learning experiences than the control group. The experimental group's learning experiences increased over time, while the control group's learning experiences decreased. The study also found that the experimental group had higher self-efficacy and motivation than the control group. The study was limited by its quasi-experimental design and the lack of random assignment.

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Figure 1. The effect of the company's reputation on the consumer's perception of the company's ethical behavior. The figure shows two side-by-side photographs of a person's face. The left photograph shows the person with a neutral expression, and the right photograph shows the person with a smiling expression. The caption explains that the figure illustrates the effect of the company's reputation on the consumer's perception of the company's ethical behavior.

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