

# ////// Streszczenie rozprawy doktorskiej w języku angielskim

„Badanie kierunków potencjalnego zastosowania cieczy jonowych w procesach wytwarzania i modyfikacji kompozytów epoksydowych oraz ocena ich właściwości”

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The doctoral dissertation focuses on the synthesis, characterization, and innovative application of ionic liquids and their mixtures as multifunctional modifiers and hardeners for epoxy resins and fiber-reinforced composites. The work consists of two main parts: a detailed theoretical analysis and a guide through a cycle of seven publications that describe comprehensive studies on new ionic liquid systems and their impact on the properties of the examined composite materials. The theoretical part presents an in-depth literature review, covering the history, classification, and unique physicochemical properties of ionic liquids, with particular attention given to their application in epoxy resins. The publication cycle focuses on the synthesis processes of various ionic liquids, their use in the polymerization of epoxy resins, and the analysis of their impact on composite structures, including mechanical properties, thermal properties, and fire resistance. The research demonstrated that ionic liquids can play a significant role as modifiers, enabling controlled cross-linking processes, improving mechanical and thermal properties, and enhancing the fire resistance of composites. The results open new possibilities in the design of advanced composite materials while offering practical guidelines for selecting optimal ionic liquid structures.