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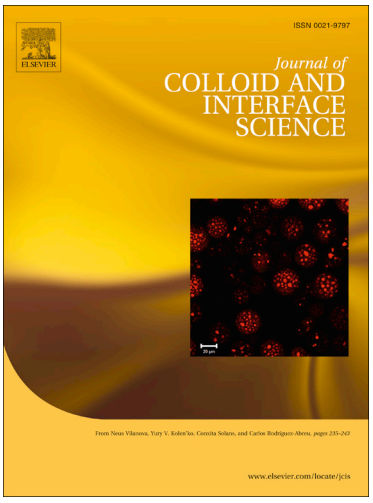

Designing hybrid materials with multifunctional interfaces for wound dressing, electrocatalysis, and chemical separation

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Designing hybrid materials with multifunctional interfaces for wound dressing, electrocatalysis, and chemical separation

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Abstract. An infinite number of possibilities can emerge from the combination of phases in hybrid systems. Interfacing phases is a strategy to obtain a set of properties in one system that are beyond the abilities of single phases. Herein, the progress in materials science exploring hybrid systems are discussed from the point of view of three important applications: wound dressing; electrocatalysis; and chemical separation. These three unrelated applications exemplify the broad impact of hybrid materials, which can be coherently designed to achieve outstanding performance. Many inspiring works have been published in the last few years, remodeling the edges of human knowledge on hybrid materials. However, the challenges in the coherent design seem to rely on the development of synthetic processes to achieve stronger integration among the phases in a hybrid material.

Keywords: Hybrid Materials, Chemical Separation, Wound Dressing, Electrocatalysis.

1. Introduction

The combination of phases to obtain complex systems is a strategy used by nature to produce marvelous structures with multifunctional abilities. In living organisms, inorganic phases associated with organic phases composes tissues of high mechanical resistance, as bones and exoskeletons. In these hybrid systems, the inorganic phases have the purpose of adding strength and hardness, while the organic phases act as a binder in addition to numerous other primary biological functions. The combination of organic and inorganic phases, which produce hybrid materials, is found in almost all living organisms, whether of low or high complexity. Hybrid materials refer to a special class of materials that are achieved by the appropriate combination between two or more phases, at the nanoscale or at the molecular level, in order to obtain final materials with superior properties [1-3]. The combination of different phases