

## عنوان مقاله:

Applications of Zeolites in Nano Medicine

## محل انتشار:

چهارمین کنفرانس ملی زئولیت ایران (سال: 1396)

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## خلاصه مقاله:

A particular structural feature of zeolites relative to other aluminosilicate materials, and other crystalline materials in general, is the existence of channels and/or cavities linked by channels. One of the characteristics that distinguishes zeolites from other porous materials is their variety of pore sizes and shapes. The size and shape of channels/cavities in zeolites therefore define the structural parameters of a given type of zeolite. The basic structure of zeolites is biologically neutral. Zeolites can have water as part of their structure; after the water has been driven off by heating, the basic framework structure is left intact. Subsequently, other solutions can be put through the structure, and thus the zeolite acts as a delivery system for the new fluid. This process has been exploited and applied in medicine [1]. They are biocompatible and are used as safe oral magnetic resonance imaging (MRI) contrast agents [2]. Examples demonstrate that different zeolites can be exchanged with cations, functionalized or loaded with drug molecules for specific biomedical applications. Different parameters were varied such as aluminum content in the zeolite, effect of distribution of functional groups and the method of surface modification. Controlled release in zeolites has been achieved through modifying the external surface of the zeolites with functional groups. The release is controlled by a number of factors such as the pore size, the nature of the grafted functional groups, and the nature of intermolecular interactions. By changing the physicochemical properties of the host materials we can change the nature of interactions of the guest (drug) molecules and as a result of which we have better control over the loading and release properties of drug molecules in these materials [3]. Drug delivery systems are basically classified based on their release mechanism and the method of their preparation. The different types of drug delivery systems include; (a) physical systems such as porous monoliths and biodegradable systems, (b) chemical systems which involve the immobilization of the drug molecules, and (c) biological systems which include gene therapy [4, 5]. Exploring the possibility of using zeolites in tissue engineering scaffolds is a potential approach in regenerative medicine because of their biocompatibility and other properties mentioned before. Tissue engineering scaffolds are porous structures fabricated from synthetic and naturally derived biodegradable polymers which serve as transitory artificial extracellular ... matrix that promotes cell attachment.

## کلمات کلیدی:

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