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Organic-inorganic nanocomposites for biomedical applications

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Polyurethane (PU) and PU nanocomposites with good biocompatibility and mechanical properties can be used as the biomedical matrix and tissue engineering biomaterials. Magnetic nanoparticles, especially ferrite nanoparticles have attracted much interest due to their specific physicochemical properties in various areas including magnetic recording, biosensing, catalyst, drug delivery systems, magnetic resonance imaging (MRI) and cancer therapy. Despite all these advantages, the nanoparticle agglomeration reduces the efficiency of the nanoparticles, so the nanoparticle incorporation into an appropriate polymeric matrix to prepare organic-inorganic nanocomposites is a right direction in the current scenario of biomedical nanotechnology. In this study, organic-inorganic PU nanocomposites based on zinc and copper ferrites and with the same composition of PU were prepared. The properties of PU nanocomposites were evaluated by nanoindentation, water contact angle and water absorption measurements. The presence of the nanoferrite nanoparticles affects properties of PU nanocomposites such as bulk morphology, mechanical, and biological properties. The biocompatibility of PU nanocomposites was investigated by MTT assay and cell attachment using endothelial cells. According to the results, the prepared PU nanocomposites with noncytotoxic chemistry could be a potential choice for vascular implants development.

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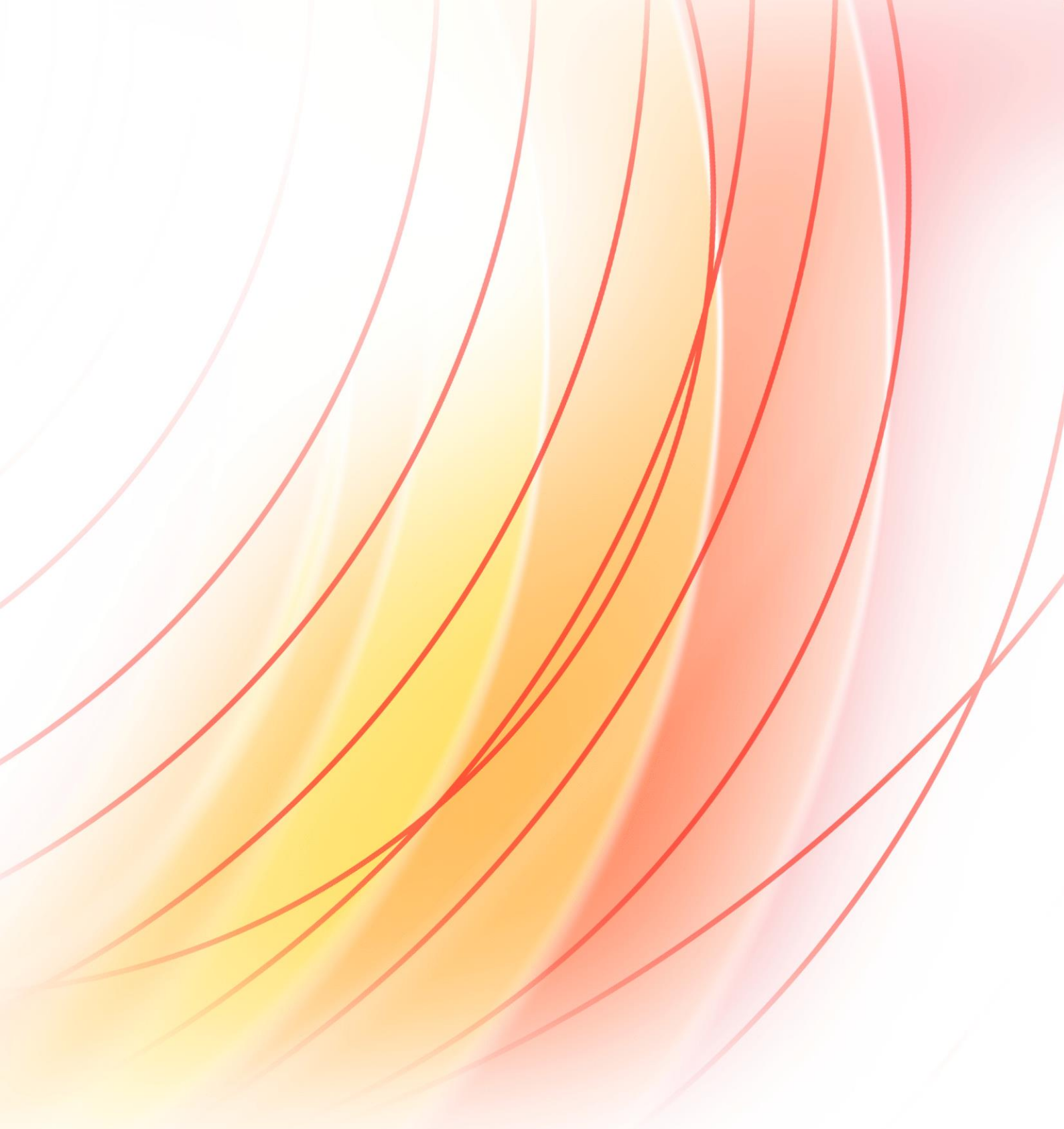
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