Photoluminescent polymer cryogels based on 2-Hydroxyethyl methacrylate complexes

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In this work highly photo-emissive polymer cryogels were prepared starting from a new approach based on our previously achieved results concerning 2-Hydroxyethyl methacrylate– transition metal complexes. In the first step a complexation reaction in aqueous medium is initiated between the HEMA ligand and Tb^{3+} cations. Further on, the resulted aqueous complex solution is mixed with N,N'-methylene bisacrylamide and polymerized in the presence of a certain photoinitiator The polymerization process undergoes at 263K in the presence of 310 nm UV radiation. The resulted frozen gel is allowed to gradually reach the room temperature and further dried at 60^{o}C to remove the water retained in the porous structure of the cryogel.

The resulted cryogel (Figure 1) presents an impressive photoluminescence under UV excitation, with high intensity, narrow emission peaks arising from the specific radiative transitions within the Tb^{3+} cation. Structural investigation was performed using FTIR while the morphology of the resulted cryogels was investigated using SEM and BET analysis. The photoluminescent properties were also investigated in detail through fluorescence spectroscopy. The newly prepared highly photoluminescent cryogels could be potentially interesting for applications ranging from sensors to innovative light sources.

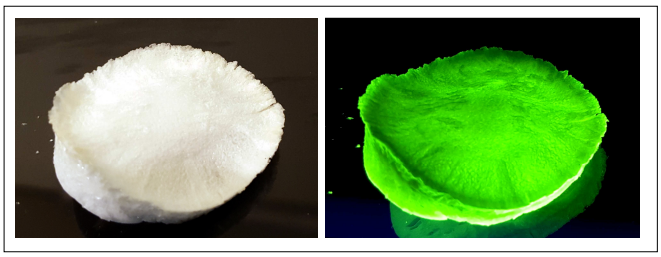

Figure 1: The prepared cryogel in ambient lighting conditions and under UV excitation

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