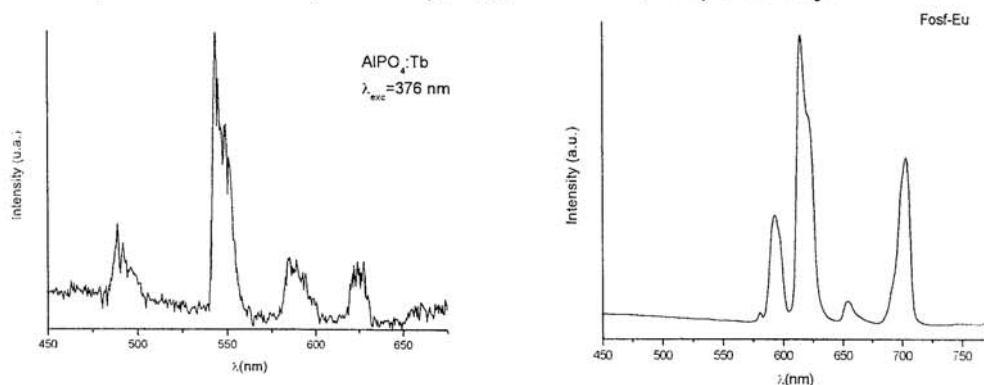


## P65 - Photoluminescence of aluminum phosphate glasses doped with rare earths

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Aluminum polyphosphate nanoparticles obtained by room-temperature compression molding are precursors of glassy bodies, considering that their small size allows a close packing evidenced by their near transparency. On the other hand, it is well known that submicrometer particles undergo sintering at lower temperatures.<sup>[1]</sup> The nano-sized aluminum polyphosphate displays exhibits two seemingly contradictory properties: particles do not aggregate within an aqueous solution but they easily do so under cold-pressing. This contributes to the lowering of the aluminum phosphate/aqueous solution interfacial tension and also raises the ionic mobility within the matrix. The particles therefore do not coalesce while they are dispersed in the aqueous medium; however, they do so upon drying. To conclude, a simple ionic precipitation allows us to prepare many different noncrystalline aluminum polyphosphates. The products obtained by this method have a widely variable chemical composition, ranging from P:Al (molar ratio) 0.4 to 3.0. This behavior is interesting, because solids with different properties are obtained, ranging from soft glasses at a high P content to refractory powders at high Al content [2, 3]. The photoluminescence behavior is studied of the matrix doped with 5% mol of europium nitrate and the matrix doped with 5% mol of terbium nitrate. The compositions present red and green color, respectively, under UV excitation. The excitation and emission spectra at nitrogen temperature were collected to analyze the behavior of rare earths ions in this glass. Figure 1 shows the spectra of glass doped with Tb<sup>3+</sup> (5 %mol),  $\lambda_{exc}=376$  nm, and the glass doped with Eu<sup>3+</sup> (5 %mol),  $\lambda_{exc}=396$  nm, respectively.



[1] Scherer, W. J. *Non-Cryst. Solids* **1985**, 73, 661.

[2] Lima, E. C. O.; Galembeck, F. *Colloids Surf., A: Physicochem. Eng. Aspects* **1993**, 75, 65.

[3] Lima, E. C. O.; Galembeck, F. *J. Colloid Interface Sci.* **1994**, 166, 309.