

OPTICAL PROPERTIES, MORPHOLOGY AND LONG TIME DEGRADATION OF ALQ3 THIN FILMS

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Abstract The photoluminescence (PL) of Alq3 thin films decays in time because physical and chemical degradation processes start to take place soon after their evaporation. The time evolution is very complex and dependent on the environmental conditions. Moreover, also thermal treatments strongly influence the decay. In order to understand the behaviour from the microscopic point of view, systematic measurements of the optical properties were performed on several thin films of Alq3. Their monitoring was carried out for about 50,000h, and mostly emission properties were measured. Lately, we found that the PL time evolution can be described as the sum of four exponential decays which possess vastly different amplitudes, constant times and spectral features. This phenomenological approach was called the Four Components Model (FCM). Preliminary results in a particular film are substantially in agreement with the FCM, but other films are still being analyzed in details, with some interesting novelties. It is worthwhile to note that the FCM not only describes the optical properties of the Alq3 films, but is deeply connected with their molecular structure, and then with the OLEDs properties.