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Crystallization characteristics on copper(Ⅱ)-phthalocyanine thin films prepared by thermal vacuum evaporation

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Copper(Ⅱ)-phthalocyanine (Cu-Pc) thin films have been fabricated on the substrates of ITO glass, slide glass, sapphire and Si wafer by using thermal vacuum evaporation techniques. The films are annealed during deposition or post-annealed at various temperatures in vacuum. X-ray diffraction(XRD) spectra show that the in-situ or post annealing of the films help the film more crystallized and the different type of substrates does not affect the crystallization of the films. More over the in-situ annealed samples have more stable crystal structure of β phase, compared with the post-annealed ones. Consistent with the XRD data, the surface images of Field Emission Scanning Electron Microscopy(FE-SEM) and Atomic Force Microscope(AFM) indicate that the grains appear to be more defined after annealing although the surface morphology depends on the annealing condition.