Photonic annealing of thin-film conductive coatings by pulsed optical radiation

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Thin-film conductive materials are used in the production of flexible electronics. Conductive components (metal or graphene nanoparticles) and semiconductor structures (ITO, FTO) require sintering to achieve acceptable conductivity [1]. However, this is difficult on flexible substrates, since in most cases non-heat-resistant plastics (for example, PET) are used. Therefore, the traditional thermal annealing method is not applicable. An alternative method of post-processing films is the method of annealing with pulsed xenon lamps [2], [3]. The pulsed nature of the radiation makes it possible to anneal the film without significant impact on the substrate. In this work, the results of photonic annealing of thin-film conductive coatings by pulsed optical radiation from a pulsed xenon lamp with an energy density of up to 5 J/cm2 are carried out. The JG ST2253 four-probe measuring unit (Jingle Electronics Co., China) is used to measure the conductivity characteristics of the samples. Optical characteristics of thin-film images are measured using a TUV9 DCS dual-beam spectrophotometer (SILab, China).

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