

**LARGE AREA PANEL IN ARRAY OF XENON-LAMPS  
FOR THE ANNEALING OF POLY-SI THIN FILMS  
AND THE SOLAR SIMULATOR**

Hyun-Chul Kim, Hyun-Kyo Lim, Yun-Hee Cho, Jong-Mun  
Jeong, Jung-Hyun Kim, Sang-Ho Han,  
Gi-Chung Kwon, Eun-Ha Choi and Guangsup Cho  
*Department of Electrophysics, Kwangwoon University, 447-1  
Wallgye-Dong, Nowon-Gu, Seoul 139-701, KOREA*

Polycrystalline silicon (poly-Si) film is widely used for silicon-gate metal oxide semiconductor (MOS) integrated circuits, solar cells, thin-film transistors (TFTs). Amorphous silicon (a-Si) films formed by plasma enhanced chemical vapor deposition (PECVD), are crystallized to be poly-Si films by annealing, such as solid-phase crystallization, pulsed XeCl excimer laser annealing (ELA), and xenon flash lamp (XFL) annealing. In the annealing processes of XFL, it is a large area capability about 1 m, and a low-temperature processing, and a fast annealing time, required for the inexpensive glass plate as the substrate of flat panel display (FPD). However, it also has the limitation of lamp length since the uniformity and the operation conditions become worse as the gap distance between two electrodes increases in the arc discharge.

In this report, a new type of xenon lamp is suggested as the light sources for the annealing of a-Si films. The tungsten wire is set in the center of the tube cross section and the helical shape external electrode is pasted with ~mm width at the outer surface of glass tube. The tungsten wire is applied a high AC-voltage and the helical external electrode is grounded. The tube diameter is 10 mm and the lamp length is ~1 m, but actually the lamp length has no limit. The xenon pressure is 100-300 Torr. Even if it is the high pressure discharge, the operation voltage of AC-pulse power is about 2 kV since the electrode gap distance is less than 10 mm. The spectrum is varied according to the pressure of xenon and the operation voltage. For the high energy lighting panel required for the annealing process, the xenon lamps are arrayed with gap distance 1 cm or less between lamps. This lighting panel can be also used for the test of solar cell, as the light source of solar simulator.<sup>1</sup>

1. F. Terai, S. Matunaka, A. Tauchi, C. Ichimura, T. Nagatomo, T. Homma, "Xenon Flash Lamp Annealing of Poly-Si Thin Films", J. Electrochemical Soc. Vol. 153, No. 7, 2006, pp. H147-H150.