New Barrier Rib Formation Technology of PDP Using Silicone Rubber Mold Transferred from SU-8 Master Structure and UV-LIGA Process

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Introduction

PDP(plasma display panel) development has been rapid due to its excellent performance as a large flat panel display. A barrier-rib plays an important role in defining the brightness and resolution of PDP. As such, the development of barrier-rib structure with a high-aspect ratio has been a critical issue with the development of HDTV.1)2) In this paper, we suggest a new barrier-rib formation technique for PDP to obtain a barrier-rib with a high aspect ratio and reduce the manufacturing cost. This technique is a very simple and inexpensive method consisting of printing of barrier-rib paste, drying, pattern transferring and firing. This technique can produce the desired barrier-rib shapes with a high aspect ratio.

Experiment

In this study, we used an SU-8 50 photo-resist, which is sensitive to the UV, instead of PMMA to the x-ray irradiation so that the silicone rubber mold could be applicable to a large area PDP. This paper covers the technical details of using SU-8 photo-resist as it applies to the fabrication of a silicone soft mold for a PDP barrier-rib. Fabrication and pattern transferring process are shown in Fig 1 and Fig 2. Fig 1 shows the fabrication sequence of soft mold for PDP barrier rib with high aspect ratio and Fig 2 shows process for forming barrier rib structure using pattern transferring process and its merits.

Results & Discussion

Fabrication results about SU-8 master structure, structure, silicone rubber mold and barrier rib transferred from soft micro-mold are shown in Fig 3, Fig 4 and Fig 5. The new formation technology for a PDP barrier-rib structure using the soft micro mold transferred from the SU-8 master structure has several advantages:

1. Pattern-transferring method with soft micro mold is simple and quick, thereby resulting in a high throughput.
2. Desired barrier-rib shapes(box, meander and so on) with a high aspect ratio can be made using the soft micro mold fabricated by combining the SU-8 deep lithography and the silicone rubber injection.
3. The new formation technology can be easily applied to large panels, and the deviation among barrier-rib pitches on substrates is minimal.
4. Disadvantages of conventional mold-pressing methods with hard mold can be overcome

Reference