The JUNO (Jiangmen Underground Neutrino Observatory) request the photo detector PMT (Photomultiplier Tube) with effectively large area and high quantum efficiency. The researchers in IHEP designed a new type of MCP-PMT. The small MCP unit instead of the large Dynode, the transmission and reflection photocathode were assembled in the same glass shell to form nearly $4\pi$ photocathode effective area to enhance the efficiency of the photoelectron detecting.