Product Features & Instructions

Product Features

• Adopts high-quality Grade A FR-4 glass fiber epoxy board base, with a thickness of approximately 1.6mm

• Thorough pre-treatment

• Simple production

• High success rate

• High precision, suitable for line widths above 5mil

• Clear exposure process

• Pure aluminum film vacuum packaging, ensuring more stable preservation

• Positive film printing, eliminating the need for complex color settings

Instructions

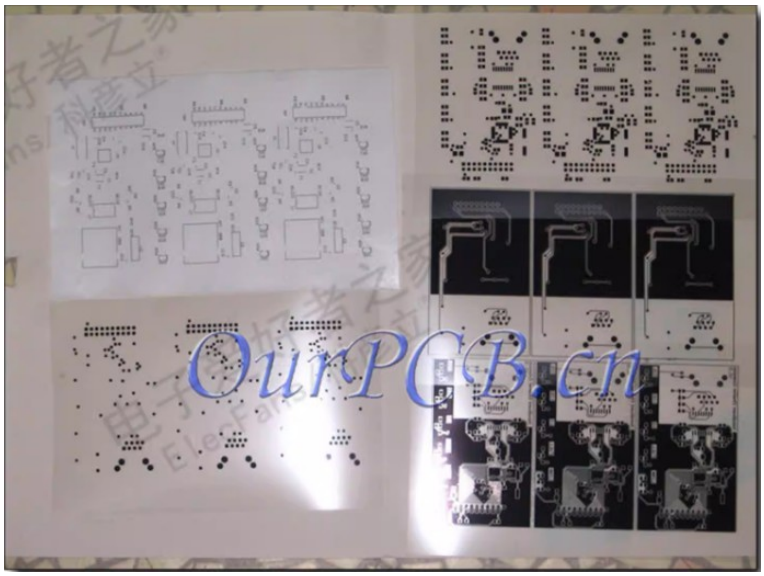
Photosensitive plate making utilizes the photochemical changes of photosensitive ink. Specifically, the exposed parts of the photosensitive ink undergo photolytic decomposition and turn red during development to form through-holes, which facilitates etching. In contrast, the unexposed parts do not react with the developer and protect the underlying copper base from erosion by etching agents during the etching process. This photosensitive plate making method offers high quality, good effectiveness, and economic practicality.

The DIY plate making process follows the same fundamental principle as industrial PCB production. It is specifically designed for convenient fabrication under non-professional conditions, with certain steps simplified technologically. Expensive equipment used in factory settings is replaced with common daily tools, which significantly reduces equipment investment without negatively impacting the quality of the finished PCB. We are confident that if you strictly follow the process outlined herein, you will consistently achieve results comparable to those of standard sample boards.

Prepare draft and film

Here is an introduction to the most commonly used circuit board software Protel, version DXP2004. Due to the positive nature of the photosensitive plate, which means that the visible part decomposes during exposure, the final circuit and copper coating that need to be preserved

are opaque on the film. The part that needs to be etched and removed is transparent on the film. This is consistent with everyone's habitual understanding. In addition, in order to facilitate positioning during later drilling, the center hole of the solder pad needs to be printed out, which is also transparent on the film.

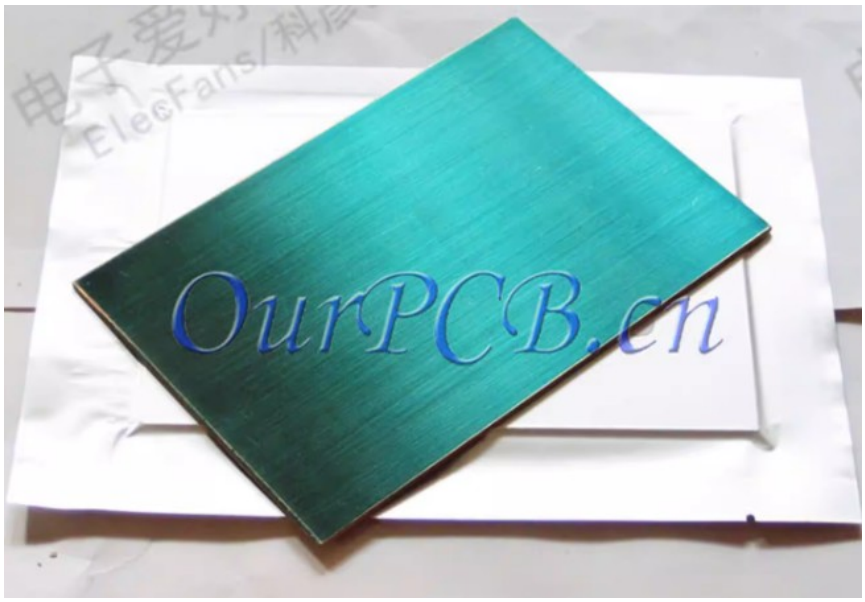


Exposure of photosensitive plate

The example used here is a double-sided board, and during production, the first step is to ensure that the device mounting holes and vias on the top and bottom layers are aligned. Take the film at the top layer and bottom layer, with the printing surface facing each other, take the installation hole of key components as the benchmark, accurately align both sides, insert a Flat noodles of the same thickness as the photosensitive plate between the two layers of film, and fix it with transparent glue.

Remove the outer packaging of the photosensitive plate, and you can see the green

photosensitive film below



Stick the printed side (carbon powder side/ink water side) of the prepared film to the blue photosensitive film. Then place two clean pieces of glass on the top and bottom to press the original and the photosensitive board tightly—the tighter the placement, the better the resolution. Fix the 四周 of the glass boards with clips to prevent displacement of the photosensitive board and the film during movement and flipping. This process can be carried out under normal indoor ambient light conditions without worrying about the photosensitive board being exposed by the indoor ambient light. You can also make a simple exposure box by using 2-4 8W 365nm ultraviolet lamps, which can ensure the stability of exposure distance and time.

Make a Light Box Yourself

The distance between the lamp tubes and the board surface should be 3-4 cm. Use 4 lamp tubes,

which can be used for exposing photosensitive boards of 200\times300mm and below as well as photosensitive ink. When using laser printed films, the exposure time ranges from 120 to 180 seconds. For boards with a large surface area, to ensure uniform exposure, pay attention to the spacing between the lamp tubes. For double-sided photosensitive boards, to prevent the harmful impact of scattered light on the non-exposed surface during exposure, a protective film can be used for shielding. After one side is exposed, transfer the protective film to the side that has just been exposed, flip the glass board, and expose the other side. The exposure time of both sides should be the same.

Once the exposure is complete, take out the photosensitive board from the two layers of films. You can see that the circuit lines have faintly appeared on the photosensitive board. The areas exposed to light turn dark blue, while the shielded areas show almost no discoloration.

Tips: Besides using 365nm ultraviolet light for exposure, direct sunlight can also be used. On sunny midday days without cloud cover, direct sunlight contains abundant ultraviolet rays, and the exposure time only needs to be 1-2 minutes.

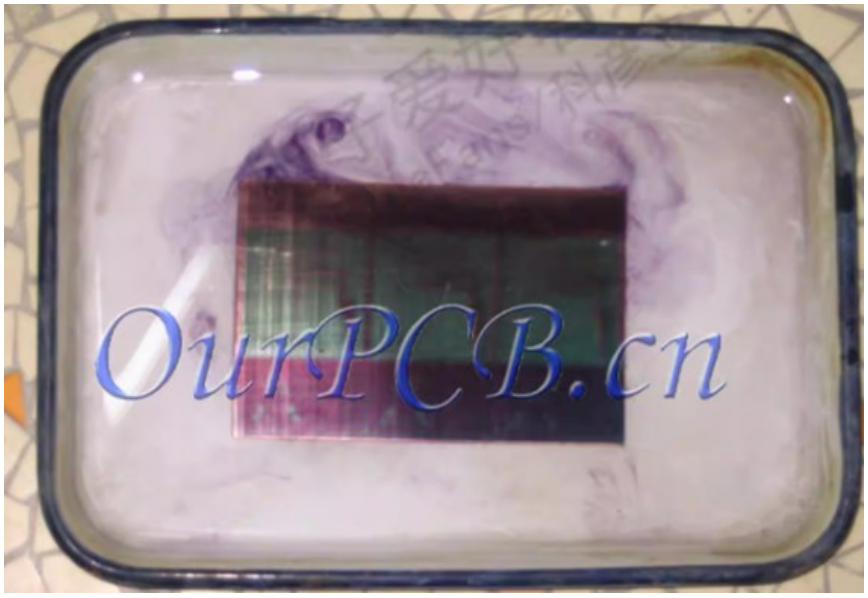
These two light sources are exceptions; incandescent lamps, daylight lamps, disinfection ultraviolet lamps, mosquito killer lamps, etc., cannot be used as exposure light sources. We often receive customer inquiries about why the development fails after exposure: the film layer shows no change after development, and the film peels off completely after a long time without forming circuit lines. Almost without exception, the investigation reveals that inappropriate light sources are used. Please pay close attention to this!

The appropriate exposure time is for reference only and is related to the storage time of the film printing quality and the photosensitive board. It is recommended to use small pieces of the board for a test exposure during actual production to determine the accurate exposure time. After the exposure is completed, take out the photosensitive board from the two layers of films, and then development can be carried out.

Development of Photosensitive Board

After the photosensitive board is exposed, take an appropriate amount of special developer for positive photosensitive boards and fully dissolve it with water at a ratio of 2:100 to prepare a developing solution, which is placed in a plastic tray. The temperature of the developing solution is preferably 25°C - 35°C. Put the exposed photosensitive board into the tray and shake the container gently. You can see that the parts exposed to light rise into light blue "smoke" and dissolve rapidly, finally revealing the bright bare copper substrate. The parts blocked by the black

ink on the film are unaffected by development and remain intact after development. Meanwhile, the developing solution turns light blue.



The entire development process should take about 1 minute. Excessively long development time is harmful to the film layer. Prolonged development exceeding 10 minutes may cause complete peeling of the film layer, which should be avoided. After the development is completed, rinse the photosensitive board with clean water to remove the residual developer from the board surface。

After drying, inspect the board for defects using a magnifying glass. Defects generally fall into two categories:

1. Exposed copper substrate on the film layer where there should be no copper. This is mainly caused by uneven base film or damaged black areas leading to light leakage. This can be carefully repaired using an oil-based marker (available at general stationery stores).

2. Excess film layer connecting lines that should not be connected. This is primarily due to dirty photosensitive board surfaces, films, or glass plates, coupled with dust or dirt. In such cases, carefully scrape off the excess film layer using a craft knife or similar tool under the magnification of a lens.

Crucial repair work must be done thoroughly before etching—this is a frequent point of failure for users, so please pay close attention.

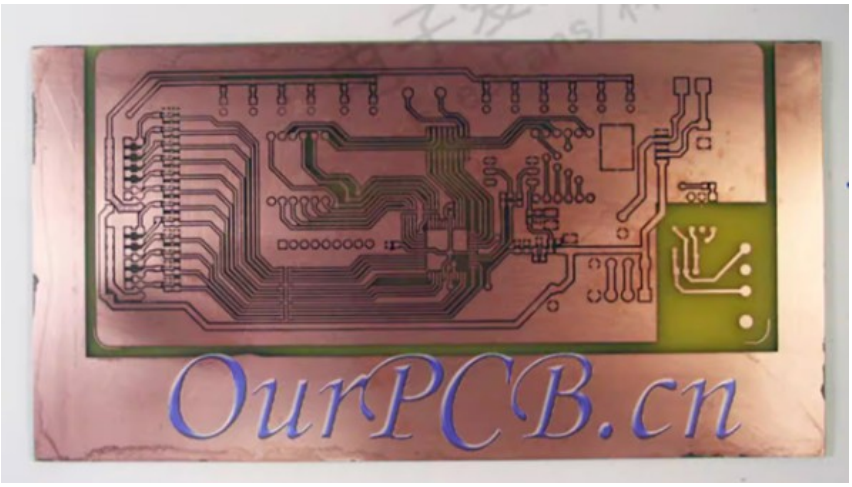
Tips:

Developers should be prepared fresh for immediate use. Excessively high concentration or temperature of the developer may cause rapid damage to the board's film layer, which should be avoided.

Special Note:

The developer specified for positive photosensitive boards as used in this store is intended for use with our photosensitive boards. We have not tested developers from other brands, so we cannot guarantee their effectiveness. We disclaim all responsibility for failures caused by using developers of other brands.

After development, the photosensitive board undergoes etching and film removal treatments to become a functionally usable PCB.



Note:

1. Must use film positives or sulfuric acid paper for transfer; regular A4 paper cannot be used for transfer.

2. The concentration of the developer is 2% (different from other brands of photosensitive boards which cannot be adjusted to 5%).

3. Strictly follow the ratio standards specified in our tutorial for operation! Keep in mind that photosensitive boards from different manufacturers adopt completely different production processes, so the required ratios are all different.

Thickness: 1.5mm