

Experimenters with Microwave Oven

Almost everyone has at home a Microwave Oven. It is possible make some experimenters with it. Most interesting and visual experiment is Experiment with Bulbs. We may find how microwaves effect to incandescent (filament) and CFL bulbs.

I bought at nearest Walmart a kit of bulbs for repair of my Christmas-tree light decorates. **Figure 1** shows the kit. The kit contains 5 bulbs for 2.5- 3.0- V. **Figure 2** shows the bulb from the kit. For me it was interesting the behavior of the bulb in my Microwave Oven. I put the lamp in the oven with some meals and turn on the oven. The bulb is flashing very brightly according to oven's magnetron pulse radiation. The lamp is flashing anywhere in the Oven- at the turning plate or being sealed at the Oven's door. Adding several centimeters of wire to the bulb leads may kill the bulb in the oven. Leads of the bulbs may be soldered together at the ends. It is not prevent the Lamp from flashing in the working microwave.



Figure 2 Bulb from the kit for repair Christmas-tree light decorates

Next subject for experiment was a 120V/20W filament bulb. It was lamp from an old microwave. Bare lamp did not flashing in the microwave Oven. Then I added to the lamp leads a loop in perimeter 12 centimeters. The loop was a loop antenna that tuned to 2.45- GHz. The lamp was a load for the antenna. Just remind, that oven's magnetron works at the 2.45- GHz. **Figure 3** shows design of the probe. I put the probe inside of the Microwave Oven with some meals and turn on the oven.



Figure 1 Kit for repair Christmas-tree light decorates



Figure 3 20W Probe (A)

The probe bulb is flashing very brightly according to Oven's magnetron pulse radiation. I experimented with filament bulb for 120V/40W, 120V/60W and 120V/100W. All bulbs flashing enough brightly in depend of a load (water, meals, etc) that was being inside of the Oven.



Figure 3 20W Probe (B)

Next step was to test a CFL lamp. I have lots CFL lamp with removed base (I used the base to find electronics parts for my experiments). Figure 4 shows the CFL lamp with removed base. I put the CFL lamp inside of the Microwave Oven with some meals and turn on the Oven. The CFL lamp is flashing steady very brightly do not depend on to oven's magnetron pulse.

It was understandable for me. CFL lamp makes light because of luminophor on the inner side of tube. The luminophor has low reaction - turn off any CFL lamp and see that it was not be dark immediately. At usual conditions the CFL lamp is lighting because of low temperature plasm inside of the lamp. The plasm generate UV that luminophor transform into visible light. In normal working conditions the plasm occurs due to high voltage across the CFL bulb leads. In the Microwave Oven the plasm occurs due microwave radiation. I tested in the Microwave Oven working CFL with working base. It is not damaged the lamp.

Figure 5 shows blowing a CFL Lamp inside a Microwave Oven. Figure 6 shows blowing a small lamp inside a Microwave Oven.

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Figure 4 CFL Lamps



Figure5 Blowing a CFL Lamp inside a Microwave Oven



Figure 6 Blowing a small lamp inside a Microwave Oven