

**Black Body Radiation**

**NOTE: I keep this one in my office so the lightbulbs don’t get crushed.**

**You’ll pick it up in RH 580.**

**Chemical available:** None

**Materials for demonstration provided in kit:**

2 Variacs, 3 socket extenders, three different brands of light bulb including “Edison bulb” , surge protector for extra sockets

**Materials used for multiple demos to add in**: none

**Materials you must grab immediately before:** none

**Procedure for in class demo**:

Use to explain however you like, here is my typical procedure:

Before class set up the extension cords and variac so you have the settings easy to use. Start with the variacs low and work up. I get it so that that the first variac closest to the wall is basically stationary and the second variac is where I control the demonstration from. Play with it a bit before class to get the right setting. Flip off bulbs.

\*insert between teaching the basic concept of blackbody radiation and how it is affected by temperature\*

Have at least two volunteers come up to help (advise them not to look directly at the bulb), three is a bit better so they can all have a bulb.

Turn off all classroom lights and shut all window screens if possible.

Ask volunteers to flip on bulbs, all three, (this is why you keep the setting low, they can get really bright).

Advise volunteers to not look at the lights for the next part. And slowly increase the variac power till the bulbs are all well lit but the different colors are able to be seen. Discuss “color temperature”.

Make a note that the bulbs are all completely clear, and that sometimes bulbs will be colored or opaque to get a particular type of light, this doesn’t have to do with black body radiation, but rather absorption of unwanted light rays.

Have the volunteers sit and hold the Edison bulb yourself (or switch to anther volunteer for that one, mainly you just want your volunteers to have a chance to see the color change from a distance without hurting their eyes). Turn the variac low and slowly raise it, stopping periodically to ask the students to describe the colors. After reaching white, do the same on the way back down. Usually you can only hit red for a moment right as it goes out.

Discuss color temperature.

**Waste:**  None, but please don’t break my bulbs when putting back in the bag!