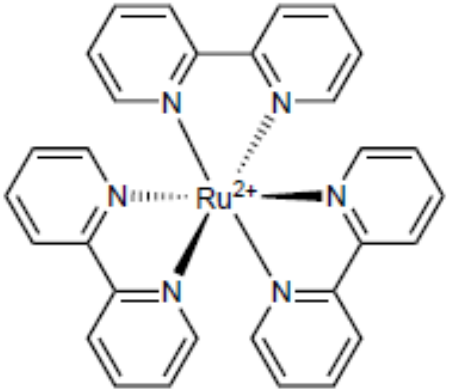
Lab #4 Organic LED

The OLED for Today



Light is emitted when Ru+ and Ru3+ combine to form two Ru2+ complex ions, one of which is in an excited state. Excited ruthenium(II) complex ions emit light via phosphorescence.

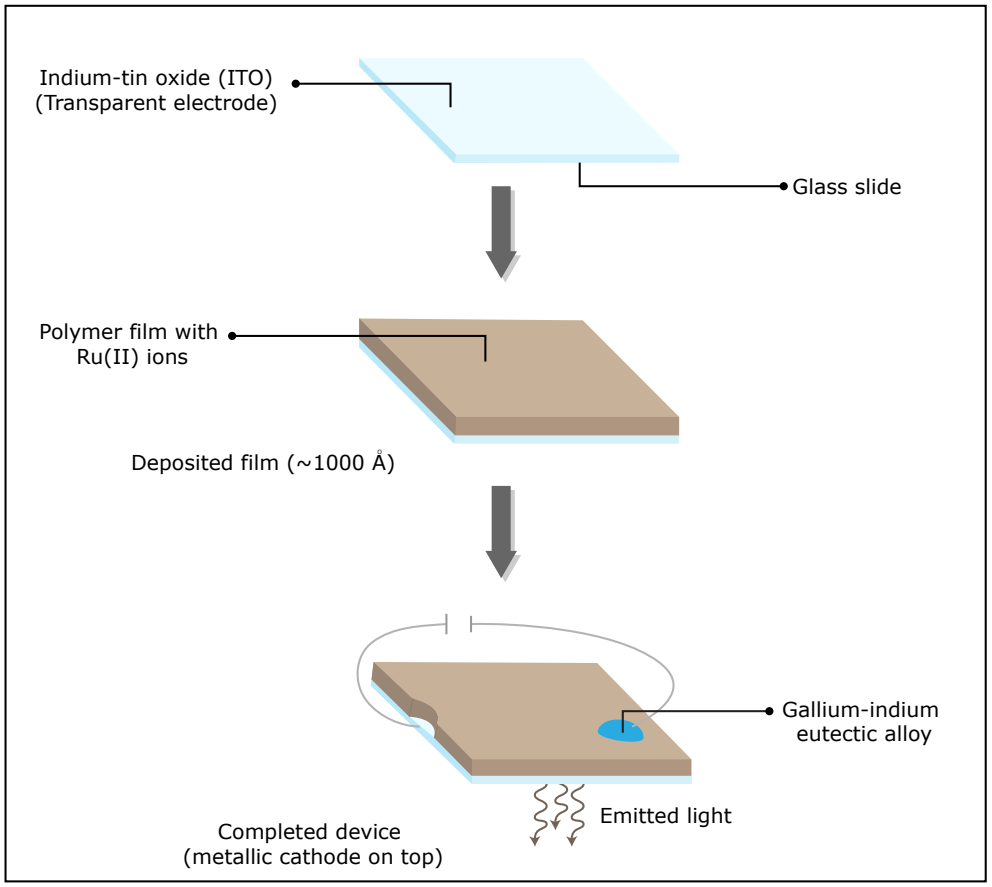


Image by MIT OpenCourseWare.

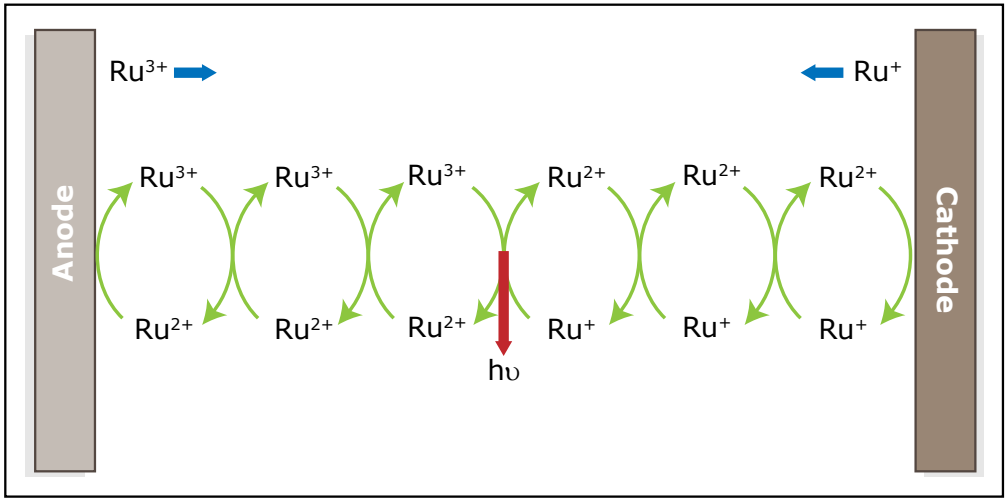


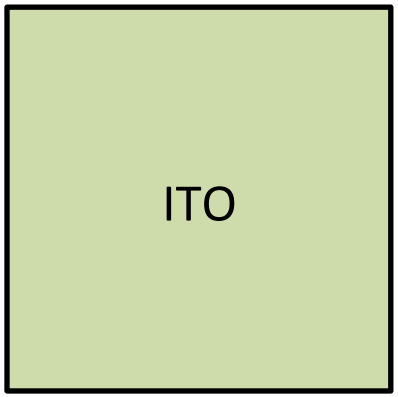
Image by MIT OpenCourseWare.

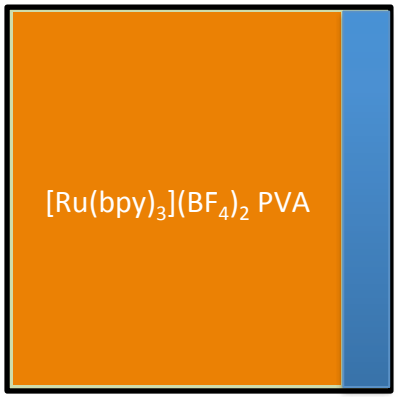
Steps

Identify the conducting side of a tin oxide-coated piece of glass by using a multimeter to measure resistance.

Use a cotton swab or computer fan to spread a thin layer of $[Ru(bpy)_3](BF_4)_2$ PVA solution on the glass. keep some uncoated regions by taping one edge.

Evaporate using a hot plate for several minutes depending on the thickness.

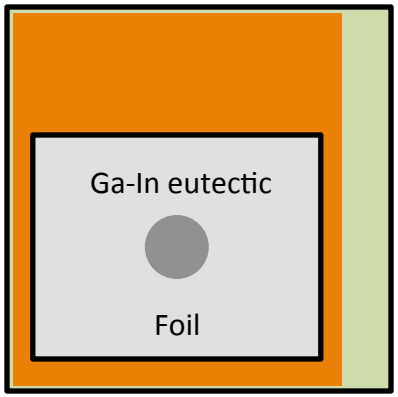




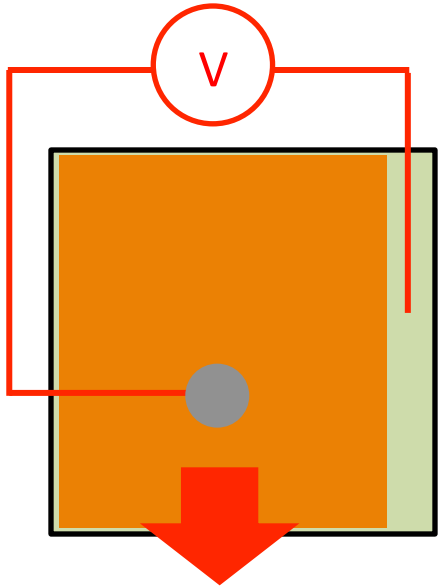
Photograph of a hot plate removed due to copyright restrictions.

Steps

Prepare a mask using a piece of duct tape on aluminum foil and punching a 2/16 inch hole.
Use a cotton swab to paint through the template with liquid gallium-indium alloy to add an active metal electrode.



Touch the positive lead of a 4.5-volt power supply to the tin-oxide glass. Gently touch the negative lead to the gallium-indium.



Q1: Is the circuit a diode? What happens if you reverse the polarity of the applied voltage?

Q2: Light!!! What is the wavelength???

Q3: How long does your OLED last? What could cause reduction of lifetime?

6.S079 Nanomaker

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