Static Separator

The burning of fossil fuel produces air pollution. To prevent the release of soot, some smokestacks have anti-pollution devices called electrostatic precipitators. These devices place a static charge on the rising soot. As the soot continues to rise in the stack, it passes through oppositely charged plates. The plates attract the soot and remove it from the smokestack gases.

Materials
- A plastic comb
- Sugar
- Pepper
- A small plate

To Do
Place two pinches of sugar and pepper side by side. Charge a comb by running it through your hair or stroking it with wool. Hold the comb several inches above the sugar and pepper. Slowly bring the comb closer to the mixture. Stop the comb when particles begin to jump onto it. Does sugar or pepper jump onto the comb first? Bring the comb closer to the mixture. Which particles jump onto the comb now?

The Science
Both pepper and sugar are attracted to the negatively charged comb. However, because the pepper particles are lighter, they jump first onto the comb. As the comb is brought closer to the mixture, the force of attraction increases. Eventually, this force overcomes the greater weight of the sugar grains. Like the pepper, the sugar now jumps onto the comb.

Check It Out! Can a mixture of sugar and salt be separated by static charges?