CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
J0724

Project Title
Danger: High Voltage Shocking Solutions

Abstract

Objectives/Goals
I tried to figure out which electrolytic solution would produce the longest sparks when used in a bottle capacitor for a Tesla coil.I hypothesized baking soda would work the best.

Methods/Materials
A tesla coil,12 glass-12 oz bottles with plastic caps, 12-1/4" by 7-8" carriage bolts with 2 matching nuts and washers each, aluminum pan and aluminum foil,adjustable grounded rod, ring terminals, 10 AWG insulated wire, 144oz. of baking soda water, salt water, and Gatorade.
methods:First construct a tesla coil that employs bottle type capacitors. Use the required amount of capacitors to match the capacitance needs of your coil, in this case,12. Then, fill the bottle capacitors the first test subject, salt water,and a 1/2" layer of motor oil to prevent corona leakage. Utilize the carriage bolts and nuts and drill them through the plastic caps, and use the nuts to secure the bolts in place. Using ring terminals, connect the capacitors in parallel. Envelop the liquid filled bottles in foil and place atop an aluminum pan.After this, check all wiring and arrange grounded rod a few inches away from the topload of the coil. Situate far away and power up the tesla coil, wearing safety goggles, rubber gloves, and rubber soled shoes.Tune the primary tap to obtain greatest spark length. Then, while the coil is on, gradually and carefully move the rod away from the topload. As soon as the spark no longer arcs to the rod,stop moving the rod, turn off the coil, discharge all components, and measure and record where the coil stopped arcing to the rod.

Results
The average results for each independent variable are as follows. Using salt water in the capacitors,the coils average spark was 5.91 inches, using baking soda, 5.65 inches, and using Gatorade, the spark was 4.15 inches. Thus I found out what solution would produce the longest arcs.

Conclusions/Discussion
The results showed salt water produced the longest arcs, and the hypothesis was that baking soda would produce the longest sparks, therefore, the hypothesis was not supported.
Since salt water particles are fairly large, it was easier for the electricity to pass between the ions and making a higher energy build up inside the capacitors.Thus proving it more conductive in this use.In addition, the longer the spark length, the larger the electro-magnetic field in which energy is capable of being wirelessly transmitted,leading to wireless energy transmission everywhere.

Summary Statement
I made a tesla coil,and tested which electrolytic solution would produce the longest sparks when used in a bottle type capacitor for a tesla coil,I found that salt water made the longest sparks and largest wireless energy field.

Help Received
Mother helped put together board; Father helped make tesla coil base; Ed Sonderman helped troubleshoot coil problems.