

Answer on Question #72849 - Physics / Other

8 drops of water combine into 1 drop. How many time charge and potential increases?

Solution:

Let us denote as q and r the charge and radius of a one drop of water. The potential of the electric field of one drop at the surface

$$\varphi = k \frac{q}{r}$$

When 8 drops of water combine into 1 drop the total charge of a new “big” drop

$$Q = 8q$$

Since the total volume of water should not changes

$$8 \times \frac{4}{3} \pi r^3 = \frac{4}{3} \pi R^3$$

$$R = 2r$$

where R is a radius of a new “big” drop.

Therefore, the new potential

$$\varphi' = k \frac{Q}{R} = k \frac{8q}{2R} = 4k \frac{q}{r} = 4\varphi$$

Answers: 8 times, 4 times.

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