

## Examrace

# Triboelectric Series: Which Materials Become Neutral, Negative or Positive on Rubbing

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### Materials That Become Positive in Charge

The materials at top have greatest tendency to give up electrons

Most (+) charges	<b>Air</b>
	<b>Dry human skin</b>
	<b>Leather</b>
	<b>Rabbit fur</b>
	<b>Glass</b>
Moderate (+) charges	<b>Human hair</b>
	<b>Nylon</b>
	<b>Wool</b>
	<b>Lead</b>
	<b>Cat fur</b>
	<b>Silk</b>
	<b>Aluminum</b>
Least (+) charges	<b>Paper</b>
<i>Positive Materials</i>	

### Neutral

There are very few materials that do not tend to readily attract or give up electrons when brought in contact or rubbed with other materials.

Materials that are relatively neutral	
<b>Cotton</b>	Best for non-static clothes
<b>Steel</b>	Not useful for static electricity
<i>Neutral Materials</i>	

## Become Negative in Charge

The following materials tend to attract electrons when brought in contact with other materials. They are listed from those with the least tendency to attract electrons to those that readily attract electrons.

Materials that gain a negative (-) electrical charges (Tend to attract electrons)		
Least (-) charges	<b>Wood</b>	Attracts some electrons, but is almost neutral
	<b>Amber</b>	
	<b>Hard rubber</b>	Some combs are made of hard rubber
	<b>Nickel, Copper</b>	Copper brushes used in Wimshurst electrostatic generator
	<b>Brass, Silver</b>	
	<b>Gold, Platinum</b>	It is surprising that these metals attract electrons almost as much as polyester
	<b>Polyester</b>	Clothes have static cling
	<b>Styrene (Styrofoam)</b>	Packing material seems to stick to everything
Moderate (-) charges	<b>Saran Wrap</b>	You can see how Saran Wrap will stick to things on (+) list
	<b>Polyurethane</b>	
	<b>Polyethylene (like Scotch Tape)</b>	Pull Scotch Tape off (+) surface and it will become charged
	<b>Polypropylene</b>	
	<b>Vinyl (PVC)</b>	Many electrons will collect on PVC surface
	<b>Silicon</b>	
Most (-) charges	<b>Teflon</b>	Greatest tendency of gathering electrons on its surface and becoming highly negative (-) in charge
<i>Negative Materials</i>		