Supporting Information for

Ionic Electrets:

Electrostatic Charging of Surfaces

By Transferring Mobile Ions Upon Contact

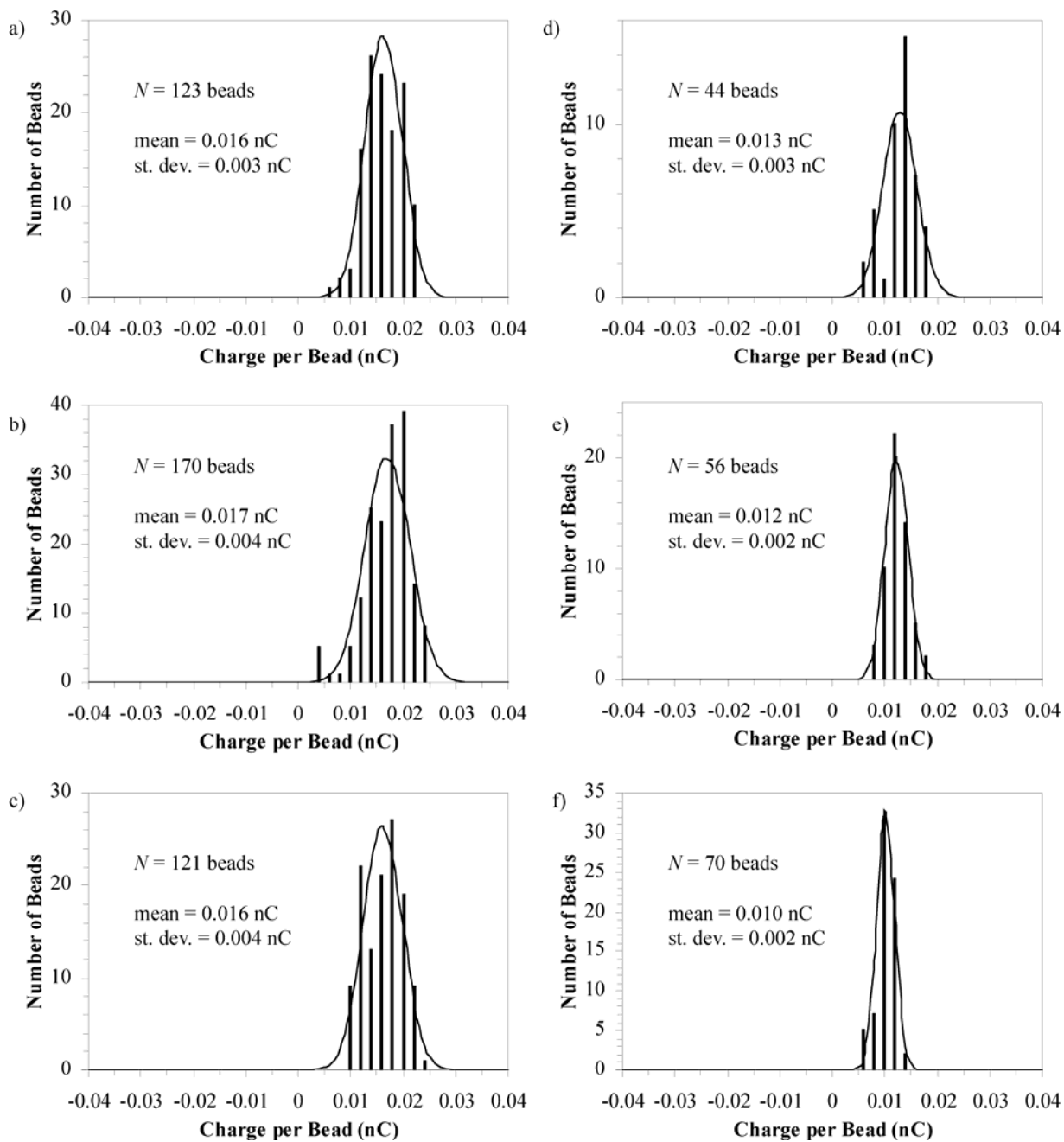Logan S. McCarty, Adam Winkleman, and George M. Whitesides

Figure S1. Histograms (charge per bead) for polystyrene beads (200-μm diameter) with tetraalkylammonium functionality (**1**). (a-c) were measured on the same day, while (d-f) were measured on different days. (The data in this figure are summarized in Figure 5a in the main text.)
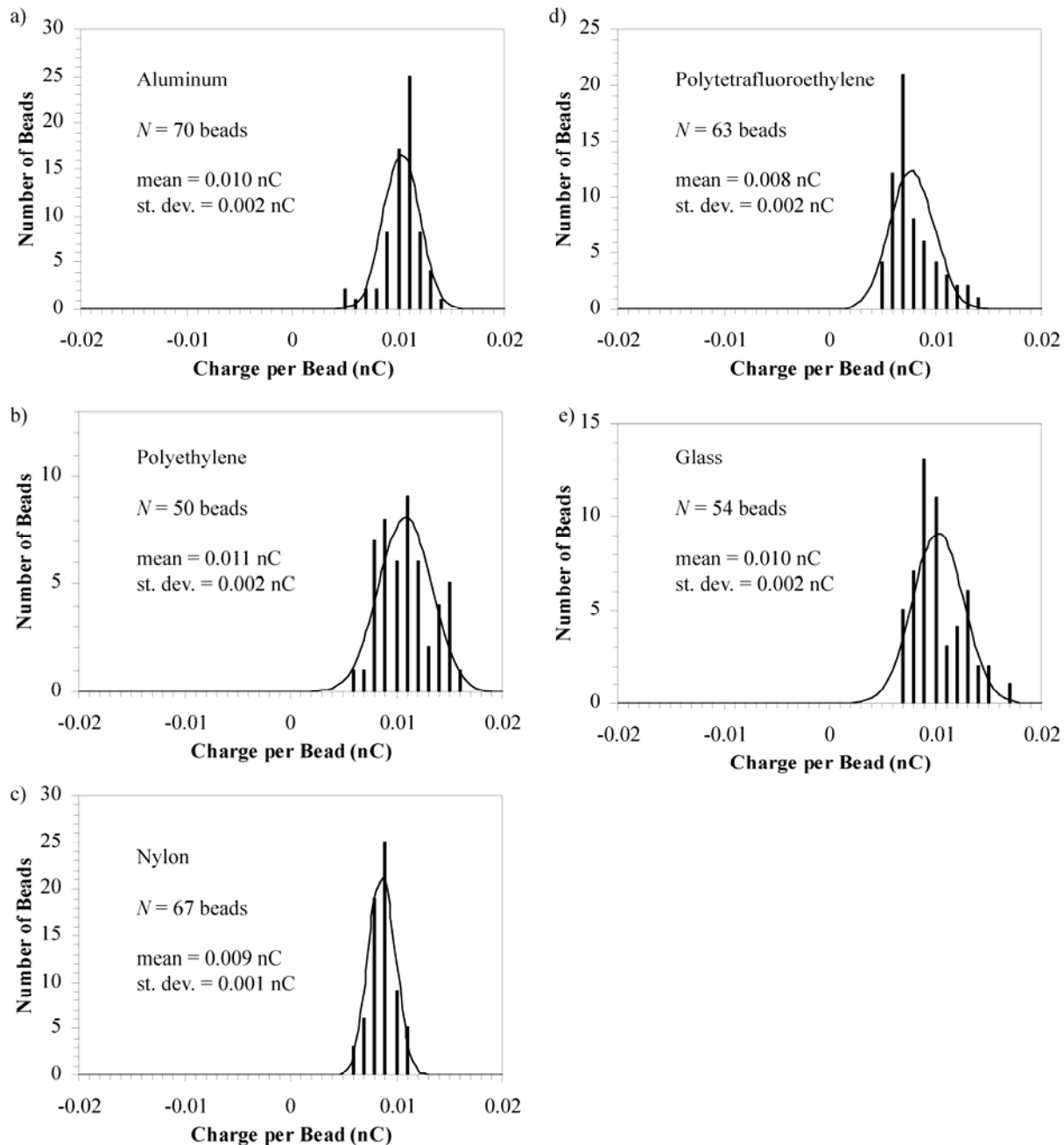
a) Aluminum
N = 70 beads
mean = 0.010 nC
st. dev. = 0.002 nC

b) Polyethylene
N = 50 beads
mean = 0.011 nC
st. dev. = 0.002 nC

c) Nylon
N = 67 beads
mean = 0.009 nC
st. dev. = 0.001 nC

d) Polytetrafluoroethylene
N = 63 beads
mean = 0.008 nC
st. dev. = 0.002 nC

e) Glass
N = 54 beads
mean = 0.010 nC
st. dev. = 0.002 nC

Figure S2. Histograms for polystyrene beads (200-μm dia.) with tetraalkylammonium functionality (**1**). The beads were charged by contact electrification with five different materials: (a) aluminum, (b) polyethylene, (c) Nylon-6,6, (d) polytetrafluoroethylene, (e) glass. (The data in this figure are summarized in Figure 5b in the main text.)
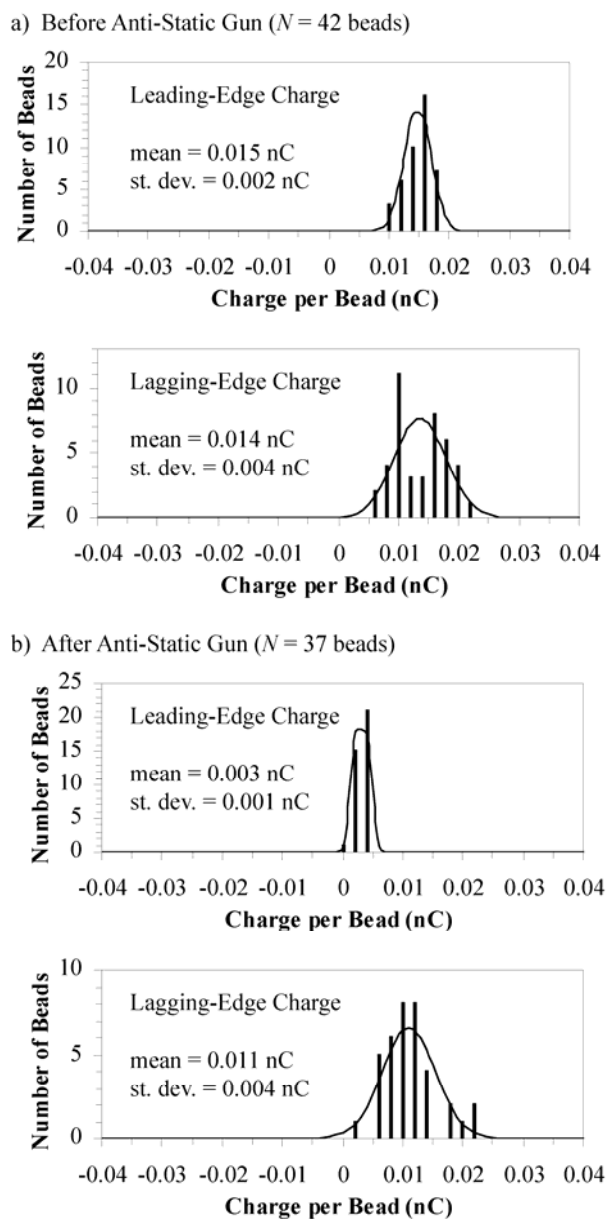
a) Before Anti-Static Gun (*N* = 42 beads)

Leading-Edge Charge

mean = 0.015 nC
st. dev. = 0.002 nC

Number of Beads

Charge per Bead (nC)

Lagging-Edge Charge

mean = 0.014 nC
st. dev. = 0.004 nC

Number of Beads

Charge per Bead (nC)

b) After Anti-Static Gun (*N* = 37 beads)

Leading-Edge Charge

mean = 0.003 nC
st. dev. = 0.001 nC

Number of Beads

Charge per Bead (nC)

Lagging-Edge Charge

mean = 0.011 nC
st. dev. = 0.004 nC

Number of Beads

Charge per Bead (nC)

Figure S3. Histograms (charge per bead) for polystyrene beads (200-μm diameter) with tetraalkylammonium functionality (**1**) charged against polyethylene. (a) Charges on beads after contact with polyethylene. (b) Charges on beads that had been sprayed with ions from an electrostatic gun (Zerostat) before measurement.
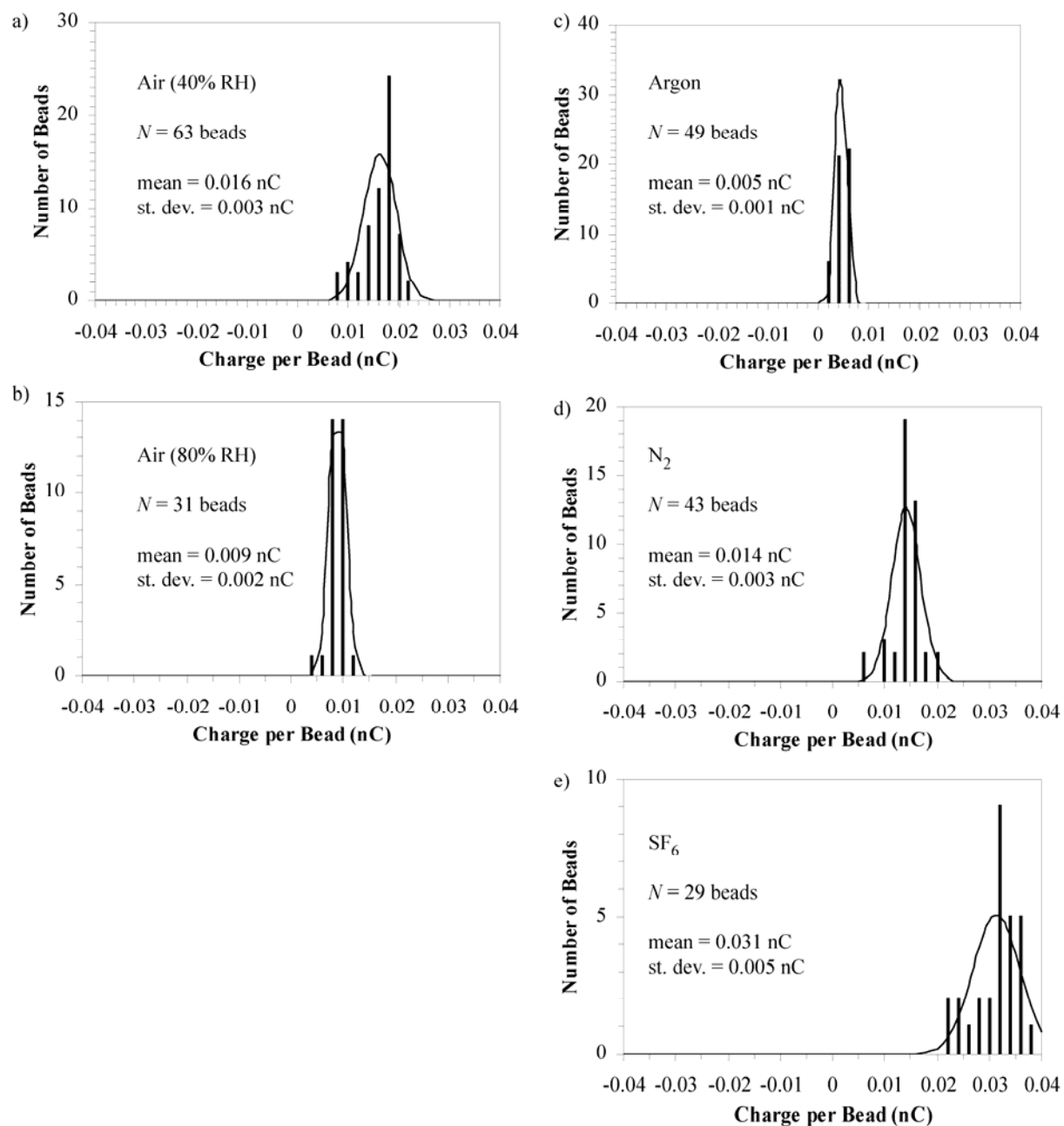
Figure S4. Histograms for polystyrene beads (200-μm dia.) with tetraalkylammonium functionality (**1**) charged in different atmospheres: (a) Ambient conditions (40% RH). (b) Ambient conditions (80% RH). (c) Inside a polyethylene bag purged with argon. (d) Inside a polyethylene bag purged with nitrogen. (e) Inside a polyethylene bag purged with SF$_6$. (The data in this figure are summarized in Figure 7b in the main text.)
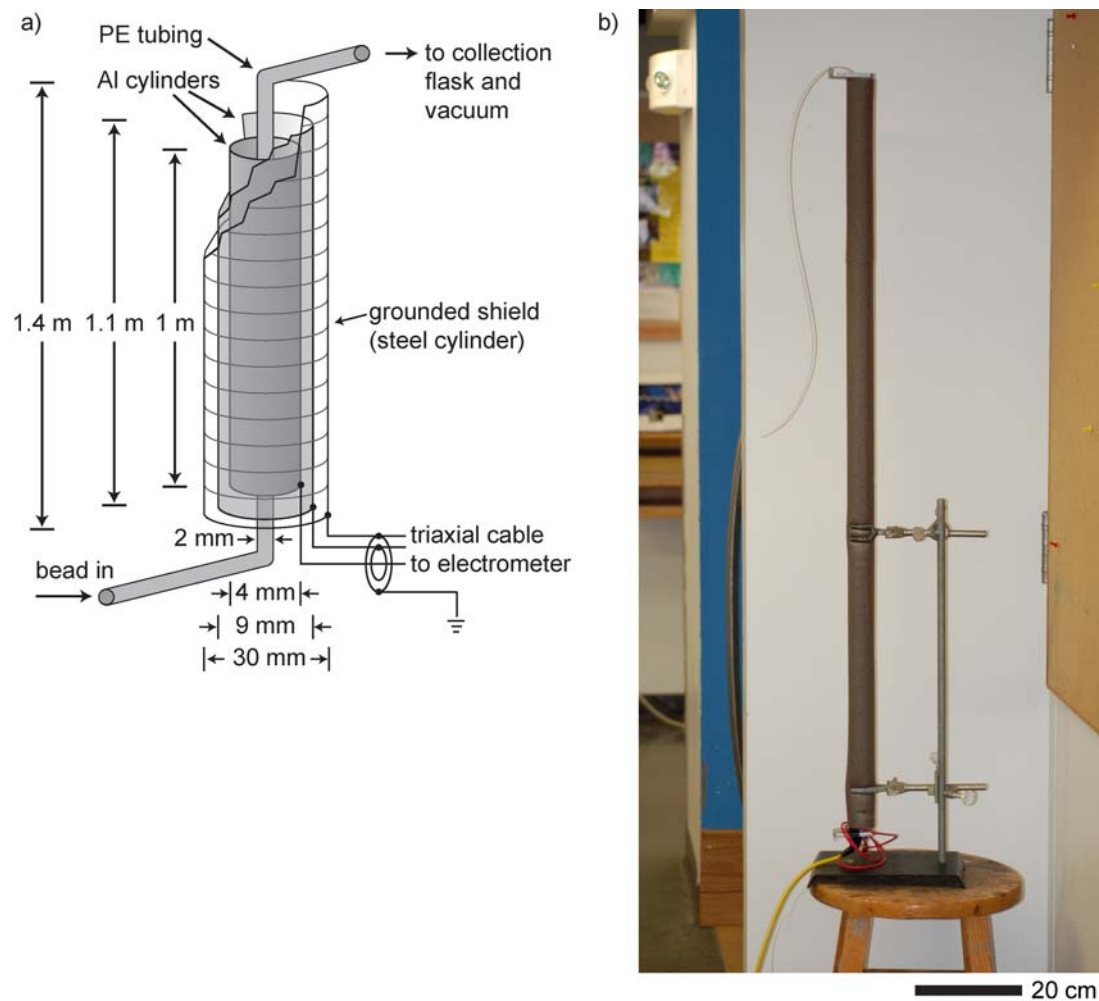
Figure S5. (a) Schematic illustration of the apparatus used for measuring the charge on individual microspheres (reproduced from Figure 2 in the main text). (b) A photograph of this apparatus. (The cylinder is sheathed in polyurethane foam insulation.)
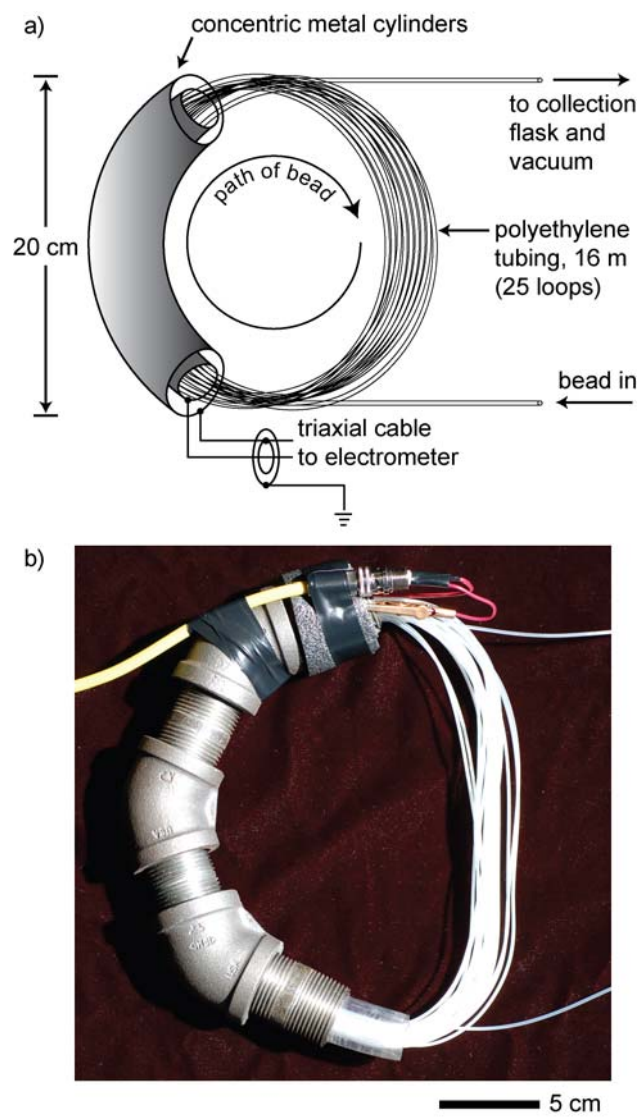
Figure S6. (a) A schematic representation of the tool used to measure repeatedly the charge on a single bead. (b) A photograph of this tool.