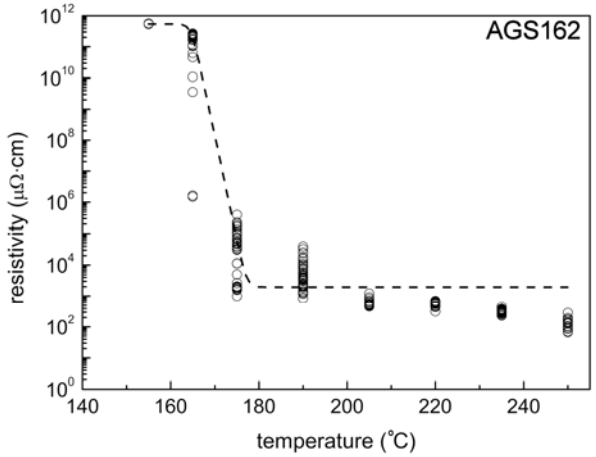
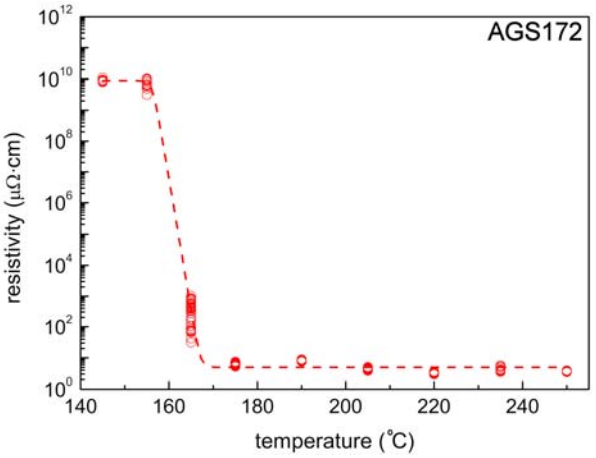
Electronic Supplementary Information (ESI):
NMR, IR, APCI-MS, elemental analysis and measured resistivity transition data of synthesized isomeric silver salts, $C_{10}H_{19}AgO_2$.

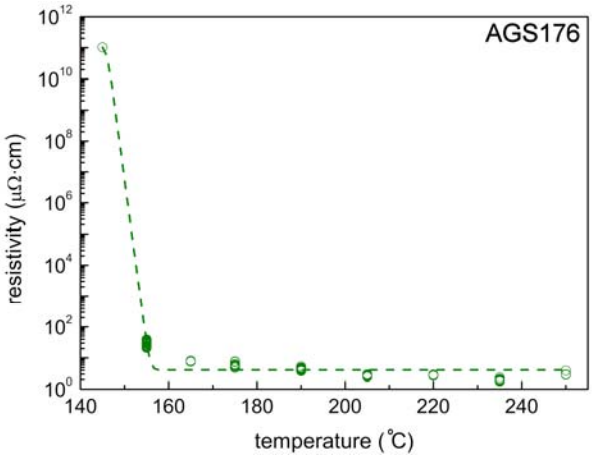
(AGS162) silver 2-butylhexanoate ($C_4H_9CH(C_4H_9)COOAg$):
^{1}H-NMR(DMSO-d_6/TMS), δ: 0.84(6H, t, J=6.9Hz, CH_3-6, 6'), 1.14-1.29(8H, m, CH_2-4, 4', 5, 5'), 1.32 and 1.46(2H, m, CH_2-3, 3'), 2.19(1H, m, CH), ^{13}C-NMR(DMSO-d_6/TMS), δ: 14.02(CH_3-6, 6'), 22.39, 29.82, 33.19(CH_2-3, 3'), 47.67(CH), 179.58(COO), IR (neat), 1520.4, 1302.2 cm^{-1} (COO^-), APCI-MS (negative mode), m/z: 171 $[M-Ag]^-$. Calcd. for $C_{10}H_{19}AgO_2$: C, 43.03; H, 6.86 ; Ag, 38.65. Found: C, 43.24; H, 7.07; Ag, 38.94.



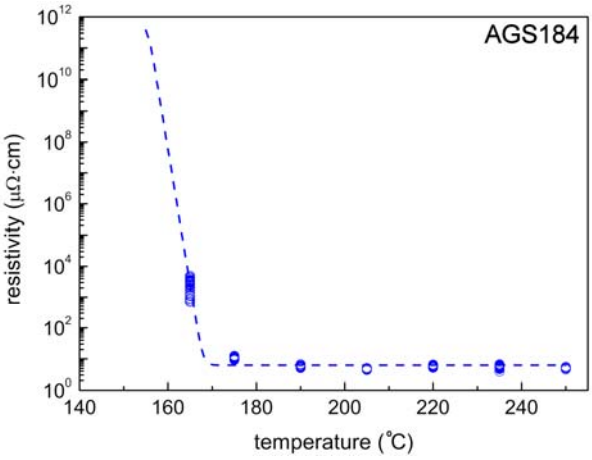
(AGS172) silver 2,5-dimethyl-2-ethylhexanoate ($(CH_3)_2C_3H_5C(CH_3)(C_2H_5)COOAg$):
^{1}H-NMR(DMSO-d_6/TMS), δ: 0.76(3H, t, J=7.3Hz, CH_3-4'''), 0.83(6H, d, J=6.6Hz, CH_3-6, 6'), 1.01(3H, s, CH_3-3"), 1.07(2H, m, CH_2-4), 1.27-1.63(5H, m, CH_2-3, 5, 3'''), ^{13}C-NMR(DMSO-d_6/TMS), δ: 9.58(CH_3-4'''), 22.45, 22.56, 22.71, 28.26(CH-5), 32.54(CH_2-4), 33.73(CH_2-3'''), 37.72(CH_2-3), 46.78(C-2), 180.54(COO), IR (neat), 1511.1 cm^{-1}(C=O). APCI-MS (negative mode), m/z: 171 $[M-Ag]^-$. Calcd. for $C_{10}H_{19}AgO_2$: C, 43.03; H, 6.86; Ag, 38.65. Found: C, 43.22; H, 7.03; Ag, 38.90.



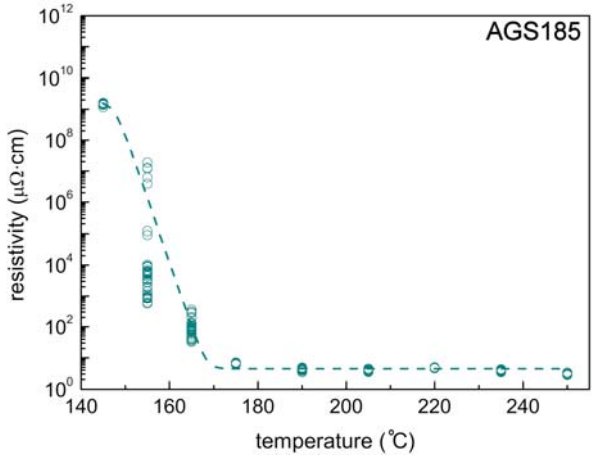
(AGS176) silver 2-ethyloctanoate ($C_6H_{13}CH(C_2H_5)COOAg$):
^{1}H-NMR(TFA-d/TMS), δ: 0.92(3H, t, J=6.1Hz, CH_3-8), 1.03(3H, t, J=7.3Hz, CH_3-4'), 1.28-1.48(8H, m, CH_2-4~7), 1.61-1.83(4H, m, CH_2-3, 3'), 2.49(1H, m, CH), ^{13}C-NMR(TFA-d/TMS), δ: 12.28(CH_3-4'), 14.56(CH_3-8), 24.22, 27.18(CH_2-3'), 29.16, 30.91, 33.44, 33.85(CH_2-3), 50.16(CH), 188.80(COO), IR (neat), 1521.9, 1299.9 cm^{-1} (COO^-). APCI-MS (negative mode), m/z: 171 $[M-Ag]^-$. Calcd. for $C_{10}H_{19}AgO_2$: C, 43.03; H, 6.86; Ag, 38.65. Found: C, 43.19; H, 6.99; Ag, 38.87.



(AGS184) silver 2,2-dimethyloctanoate ($C_6H_{13}C(CH_3)_2COOAg$):
^{1}H-NMR (TFA-d), δ: 0.87 (3H, t, CH_3), 1.27 (6H, br.s, $2CH_3$-2), 1.28-1.38 (8H, m, CH_2-4...CH_2-7), 1.65 (2H, m, CH_2-3). ^{13}C-NMR (TFA-d), δ: 189.93, 44.70, 42.59, 33.46, 31.46, 26.64, 25.74, 24.26, 14.62. IR (neat), 1515, 1390 cm^{-1}: (COO^-). APCI-MS (negative mode), m/z: 171 $[M-Ag]^-$. Calcd. for $C_{10}H_{19}AgO_2$: C, 43.03; H, 6.86; Ag, 38.65. Found: C, 43.24; H, 7.05; Ag, 39.03.



(AGS185) silver 2,2-diethylhexanoate ($C_4H_9C(C_2H_5)_2COOAg$):
^{1}H-NMR(DMSO-d_6/TMS), δ: 0.70(6H, t, J=7.3Hz, CH_3-4', 4"), 0.85(3H, t, J=7.3Hz, CH_3-6), 1.08(2H, m, CH_2-4), 1.23(2H, m, CH_2-5), 1.43(2H, m, CH_2-3), 1.48(4H, q, J=7.3Hz, CH_2 -3', 3"), ^{13}C-NMR(DMSO-d_6/TMS), δ: 8.98(CH_3-4', 4"), 14.07(CH_3-6), 23.08(CH_2-5), 26.36(CH_2-4), 27.32(CH_2-3', 3"), 34.44(CH_2-3), 50.12(C-2), 47.67(CH), 180.20(COO), IR (neat), 1519.9, 1300.8 cm^{-1} (COO^-). APCI-MS (negative mode), m/z: 171 $[M-Ag]^-$. Calcd. for $C_{10}H_{19}AgO_2$: C, 43.03; H, 6.86 ; Ag, 38.65. Found: C, 43. 18; H, 7.01; Ag, 38.81.



(AGS217) silver decanoate ($C_9H_{19}COOAg$):
^{1}H-NMR(TFA-d/TMS), δ: 0.91(3H, t, J=6.3Hz, CH_3), 1.18-1.60(12H, m, CH_2-4…CH_2-9), 1.78(2H, qn, J=7.3Hz, CH_2-3), 2.55(3H, t, J=7.3Hz, CH_2-2), ^{13}C-NMR(TFA-d/TMS), δ: 14.62(CH_3), 24.32, 26.67(CH_2-3), 30.81, 30.90, 31.05, 31.14, 33.72, 35.89(CH_2-2), 186.07(COO). IR (neat), cm^{-1}: 1513 (COO^-). APCI-MS (negative mode), m/z: 171 $[M-Ag]^-$. Calcd. for $C_{10}H_{19}AgO_2$: C, 43.03; H, 6.86; Ag, 38.65. Found: C, 42.6; H, 7.38; Ag, 41.