Abstract Submitted
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Specific Resistance of Pd/Ir Interfaces[1] RAKHI ACHARYYA, HOANG YEN THI NGUYEN, REZA LOLOEE, WILLIAM P. PRATT JR., JACK BASS, Michigan State University, SHUAI WANG, KE XIA, Chinese Academy of Sciences — In electronic transport with current-flow perpendicular to the layer planes (CPP) of a metallic multilayer, the interface specific resistance AR (area A through which CPP-current flows times sample resistance R) is fundamental. Special interest focuses upon AR for metals M1 and M2 with the same crystal structure, and lattice parameters the same to within ~ 1 percent, as AR can then be calculated with no free parameters. From measurements of the total AR of sputtered Pd/Ir multilayers, we obtain twice the interface specific resistance, $2\mathrm{AR}_{Pd/Ir} = 1.02 \pm 0.06$ fΩ m^2. For a single fcc structure with average lattice parameter of Pd and Ir, calculations including only spd orbitals give for perfect interfaces, $2\mathrm{AR}_{Pd/Ir}$(Perf) = 1.21 $\pm$ 0.1 fΩm^2, and for interfaces composed of two monolayers of a random 50%-50% alloy, $2\mathrm{AR}_{Pd/Ir}(50/50) = 1.22 \pm 0.1$ fΩm^2. These values fall just outside the range of the experimental value. Upgrading to include f-orbitals gives $2\mathrm{AR}_{Pd/Ir}$(Perf) = 1.1 $\pm$ 0.1 fΩm^2 and $2\mathrm{AR}_{Pd/Ir}$(50-50) = 1.15 $\pm$ 0.1 fΩm^2. Within mutual uncertainties, these values are compatible with the experimental one.

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