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Superconducting Fe-Based Compounds ($A_{1-x}Sr_x$)Fe_2As_2 with A = K and Cs with Transition Temperatures up to 37 K KALYAN SASMAL, TCSUH and Department of Physics, University of Houston, Houston, Texas 77204, USA, BING LV, TCSUH and Department of Chemistry, University of Houston, Houston, Texas 77204, USA, BERND LORENZ, TCSUH and Department of Physics, University of Houston, Houston, Texas 77204, USA, ARNOLD M. GULOY, TCSUH and Department of Chemistry, University of Houston, Houston, Texas 77204, USA, FENG CHEN, YU-YI XUE, TCSUH and Department of Physics, University of Houston, Houston, Texas 77204, USA, CHING-WU CHU, TCSUH and Department of Physics, University of Houston, Houston, Texas 77204, USA; — New high-Tc Fe-based superconducting compounds, AFe_2As_2 with A = K, Cs, K/Sr, and Cs/Sr, were synthesized. The Tc of KFe_2As_2 and $CsFe_2As_2$ is 3.8 and 2.6 K, respectively, which rises with partial substitution of Sr for K and Cs and peaks at 37 K for 50%–60% Sr substitution, and the compounds enter a spin-density-wave state with increasing electron number (Sr content). The compounds represent p-type analogs of the n-doped rare-earth oxypnictide superconductors. Their electronic and structural behavior demonstrate the crucial role of the (Fe_2As_2) layers in the superconductivity of the Fe-based layered systems, and the special feature of having elemental A layers provides new avenues to superconductivity at higher Tc.

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