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Heterostructures of an advanced superionic conductor (ASIC)/electrochemical indifferent electrode (IE) with giant values of electric capacity were created. For the first time it is experimentally shown that the specific capacity (ρ_C) of ASIC/smooth IE heterojunctions with special interface design can considerably exceed $\rho_C \approx 10 \mu\text{F}/\text{cm}^2$ at the frequencies $f \gg 10^{-2} - 10^{-1}$ Hz. It is revealed capacitor-like and "battery-like" behavior of the investigated heterostructures. There are observed: (i) the giant capacity $\rho_C \approx 100 \mu\text{F}/\text{cm}^2$ at frequencies $f \approx 2 \cdot 10^5$ Hz, $\rho_C \approx 300 \mu\text{F}/\text{cm}^2$ on $f \approx 10^4$ Hz); (ii) transition from capacitor-like to "battery-like" behavior. The possible application of the created heterostructures for development and manufacture of energy and power microsourses for nano(micro)system technology (NMST) and wireless networks (WN) of microsensors and microrobot are considered.

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