

## Catalysis of Impurity Coalescence by Quantized Vortices in Superfluid Helium

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Any guest particles immersed in superfluid helium possess an affinity to quantized vortex. On the example of hydrogen injected into the HeII it was proved that such impurity concentrating in practically 1-D core of vortices causes a tremendous acceleration of coagulation process and that its primary products should be nanowires. This phenomenon was then used for the production of metallic nanowires. The materials were supplied by laser ablation of targets submersed in liquid helium at  $T = 1.6$  K. Long (up to 1 cm length) bundles of wires (with thickness from 1.5 up to 7 nm) were grown in HeII and as the parent vortices they were pinned by metallic bonds to the tips of electrodes intentionally introduced in reactor. That allows carrying out the electrical studies just at low temperature. The nanowires made of well-conductive Cu and Ar, of ferromagnetic Ni as well as of superconducting Sn, Pb and In were grown and studied. Electron microscopy of the nanowires warmed up to 300 K showed that they had regular crystalline structure. Being conductors of metallic type they demonstrated strong size effects inherent in nanowires, in particular, the strong increase in resistivity and, for superconductors, transformation and temperature shift of the phase transition. Due to their high length and small radius the bundles of nanowires demonstrated powerful field-induced electron emission at rather low voltage. The mechanism of nanowires formation in HeII has been discussed.