One of the relevant approaches to keep surfaces clean without a secondary process is to use the easy-to-clean and superhydrophobic surfaces technology. These superhydrophobic surfaces have a wide potential applications in the environment and industries. When the hydrophobicity is mixed with catalytic properties of copper oxide, a more useful surface for electrical and environmental applications is obtained. According to the recent researches, the preparation of one-step durable superhydrophobic surface whiteout a secondary chemical or physical modification is reachable using the fabrication of hierarchical complex structures on the surface. In our works, the cuprous thin films were prepared by different electrodeposition methods such as galvanostatic, cyclic voltammetry, and square potential pulse depositions on various substrates. Therefore, we have fabricated different mesoscopic structures including cubes, octahedral pyramids, triangles and their truncated structures as well as porous structures including dendrites and fractals on various substrates by changing the applied deposition method, bath conditions (precursor, pH, temperature and additive agents) as well as plasma etching. The θ_W of deposited Cu2O layers was measured to be as high as 160°, without sintering and fatty acid modification. It could be concluded that an intrinsically water-repellent sample has a hierarchical structure including microstructures with small spherical balls on them and well branched micrometric vertical leaves on the surface. This provides a suitable surface for trapping the air pockets inside, reaching to the Cassie-Boxter state and achievement of superhydrophobicty.