











brass without bright nickel and low absorption spectrum associated with the nickel coating on steel with bright nickel middle layer. EDAX analysis indicates presence of nickel on formed films. X-ray diffraction analyses show that electrodeposited films have polycrystalline structure and black nickel films were mainly consisting of metallic nickel. This result is matched with result of EDAX analysis. The presence of bright nickel middle layer cues the growth of nickel structure in orientation of (111), (200) and (220).

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