



### B36 Forensic Examination of Counterfeit One New Turkish Lira Bimetallic Coins

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After attending this presentation, attendees will learn a general guideline of examination involving the physical parameters and surface features in examination of bimetallic coins.

The presentation will impact the forensic community by providing an examination guide on bimetallic coins including the core-extrusion method which is an effective and reliable supplementary method of examination.

The New Turkish Lira (Yeni Türk Lirası, YTL) was introduced on January 1, 2005. The New Turkish Lira is equivalent to one million (old) Turkish Liras (Türk Lirası, TL). In other words, six zeros were dropped from the old TL to make the YTL. Old Turkish liras were withdrawn from circulation during 2005. However within just one year after launching, counterfeit 1 YTL coins started to be found in Turkey. Counterfeit coins are usually produced by casting and show morphological details with less precision than those on genuine coins.

Since the advent of the new coin with a face value of One New Turkish Lira (1 YTL), a compound coin composed of a brass-colored inner disc and silver-colored outer ring, crime cases involving counterfeiting and use of false coins have increased in Turkey. In recent months, Turkish Police have seized many counterfeit 1 YTL coins that look like the genuine coins because of their pictures and letters, and because the feeling to the touch and weight were very similar to those genuine coins. The color and shape of counterfeit 1 YTL coins so closely resembled those of genuine coins that they could not be distinguished from genuine coins by the naked eye. The small details of stamped markings were blurred or absent on counterfeit 1 YTL coins but were clear and definite on genuine coins.

In this study counterfeit coins (1 YTL) were quantitatively analyzed by Scanning Electron Microscope with Energy Dispersive X-Ray Spectrometer after determinations of their diameter, thickness, weight, and appearance. The weight of each One New Turkish Lira (both genuine and counterfeit coins) was measured to sub-milligram using an electronic balance. The diameter and rim thickness of each One New Turkish Lira (both genuine and counterfeit coins) was measured twice employing a vernier caliper.

Scanning Electron Microscopy with Energy Dispersive X-Ray Spectrometry is a widely used nondestructive elemental analysis method. The coins were brushed and sequentially rinsed with distilled water and acetone. Each cleaned coin was mounted on a scanning electron microscope sample stub using double-sided carbon adhesive tape. The samples were then subjected to morphological observation and elemental analysis via scanning electron microscope with energy dispersive x-ray spectrometry without any coating. The working distance and magnification powers were varied while secondary image observation. A fixed working distance of 15mm and 200 times magnification were employed during energy dispersive x-ray analysis.

The major elements detected in the outer ring of both genuine and counterfeit coins were Cu, Ni, and Zn. Elements detected in the inner disc of genuine and counterfeit coins were also Cu, Ni, and Zn. The major elements percentage detected in the genuine coins were Cu, Ni, and Zn which were significantly different from the counterfeit coin samples.

**Counterfeit Coins, Elemental Analysis, SEM/EDS**