Type of presentation: Poster

ID-6-P-3253 Practical using of SEM in Forensic Science

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The scanning electron microscope is one of the most versatile instruments available for the examination and analysis of many samples in various branches of forensic science.

The high resolution, large depth of field and possibility of big magnification are basic reasons for the SEM´s usefulness.

In the presentation some practical examples of using SEM are shown.

Imaging of small objects, details of the surface or structure could be visualized and proved by evidence. It is the first area of SEM utilization.

The second one is an elemental analysis. The large area of SEM using is gunshot residues analysis. The presence or absence of GSR particles on the sample could help to determine, if the suspect person shot or not. Typical GSR analysis is described together with the experiment which was joined with this real case.

But elemental analysis wins recognition also in chemistry, in toolmark examination and in anthropology. The analysis of dental filling or metal dentures material could be very helpful for identification of unknown dead bodies. The real case describes interesting finding of skull in a Czech forest with very unusual metal denture.

SEM is also very important for examination of explosives residues. On the basis of imaging and particle analysis the method can help with determination of explosive compounds. Typical examples for SEM analysis are explosions of tube bombs, when the structure of black powder residues determination can help with estimation outer packaging of explosion object. The most famous case in modern Czech history is explosion of tube bomb on the Old Town Square in Prague in 1990. This case was never explained. The second example describes very strange finding inside the sample of explosive which was discovered by microscopy analysis.

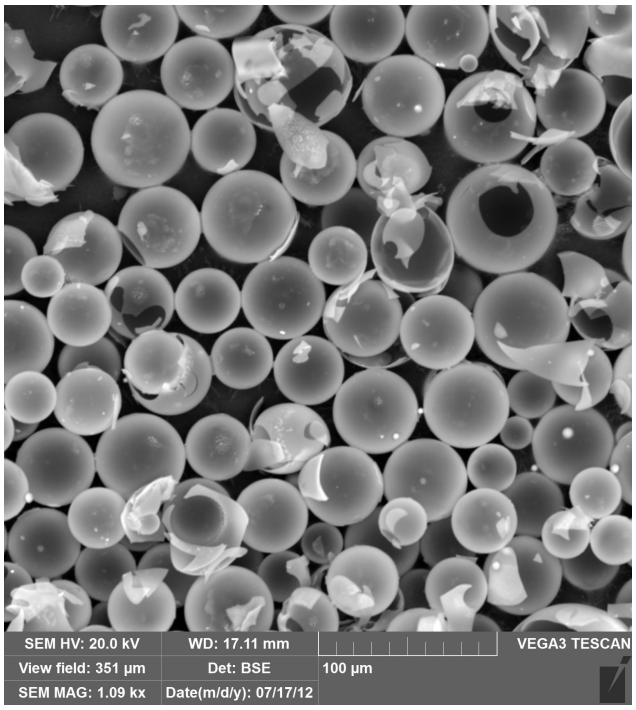

Fig. 1: Glass beads inside explosives

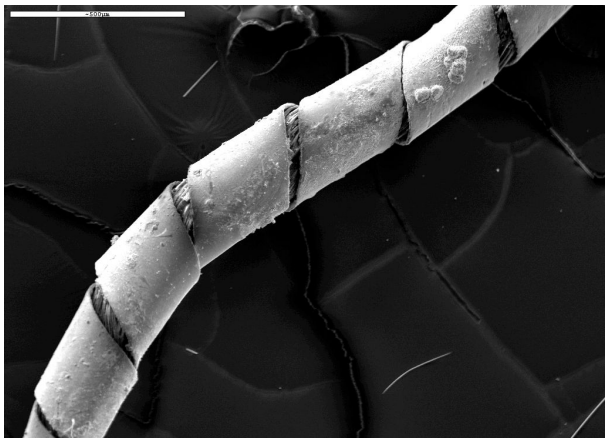

Fig. 2: Flax fibers in gold/silver strips from burial robe of Czech king Ladislav Pohrobek (15th century)

Fig. 3: Tooth enamel damaged by mineral acid