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## **External milli-beam PIXE analysis of the mineral pigments of glazed Iznik (Turkey) ceramics**

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### **Abstract**

25 Iznik glazed ceramics fragments - shards of vessels, plates for wall decorations found in Moldova's capital Suceava, in Prince Vasile Lupu (1600-1640) palace and shards excavated from a Danube ford - Piuia Pietrii, a renowned commercial centre during 17<sup>th</sup> Century were studied. We used external milli-beam PIXE (Particle Induced X-ray Emission) spectroscopy to investigate the capabilities of this method to identify the metals from ceramics mineral pigments. Cobalt, Lead-Antimony, Copper, Chromium, Iron and Manganese minerals used to obtain blue, yellow, green, red and brown colours were identified. Our PIXE results were compared with data from literature obtained on Iznik tiles samples using Raman spectroscopy proving a good compatibility.

*Key words:* external milli-beam PIXE; Iznik ceramics; pigments; Cobalt sources.

### **Introduction**

Following the establishment of the Ottoman Empire, the name of Iznik became famous throughout the world due to the development of a ceramics industry in the 16<sup>th</sup> and 17<sup>th</sup> centuries (Paynter et al., 2004). Combining the Ottoman style with external influences from China, Asia,

the Balkans and even Europe, Iznik vessels and tiles reached the peak of Ottoman ceramic art. Iznik fritware was the result of a search by the Ottoman court in Istanbul for a recipe to make porcelain with the goal of imitating the much-admired and pricey Chinese Yuan and Ming Dynasty blue-and-white porcelain. The initial copies of the Chinese designs gradually gave