



## Experiences on production - usage reasoned malfunctions & development of X-ray tubes used in science and their effects on sediment measurements

Dursun Acar<sup>1,2</sup>, Namık Çagatay<sup>2</sup>, Ş. Can Genç<sup>3</sup>, K. Kadir Eriş<sup>2,3</sup>, Demet Biltekin<sup>1,2</sup>, and Nurettin Yakupoğlu<sup>2,3</sup>

<sup>1</sup>Istanbul Technical University, Eurasia Institute of Earth Sciences, Ayazaga Campus, Maslak, Sariyer, 34469, Istanbul/Turkey (dursunacaracar@hotmail.com)

<sup>2</sup>Istanbul Technical University, Faculty of Mine, EMCOL, Ayazaga Campus, Maslak, Sariyer, 34469, Istanbul/Turkey

<sup>3</sup>Istanbul Technical University, Faculty of Mine, Department of Geological Engineering, Ayazağa Campus, Maslak, Sariyer, 34469, Istanbul/Turkey

Surface fractures at the filament of X-ray tube increase more with metal fatigue or wrong cooling and heating processes. Fractured filament continue to work as repeating open circuit positions in random times with turning fully conductive state in short time. We are explaining how open circuit flashes at the filament providing wrong measurement results. Their low voltage electric circuit conductive problems repeat in milliseconds periods. At the results, it gives the impression of healthy measurement values. Because that the measured sample absorbs photonic energy and direct it to neighbouring elements in continuous element electron scattering circulations, by the way that delayed secondary electron energy scatters hide all electron supply extinctions on the semi broken filament wire and indirect counts continue by the detector from coming reflection energy. ( real counts are not from exact beam target of sample surface during energy deprivations, and it is impossible to understand that the measurement is inaccurate because it causes similarity as discrete element counts in sedimentation layers ). Filament voltage arcs do not warn machine with error reporting systems until to whole ruptured filament touch to anode walls or their far displaced edges of 2 broken filament positioning. Erroneous records take their place in the world of science if the lithology was not followed. We collected faulty measurement data from our experiences for indicate when and how possible to facing such as events.

For eliminate explained reasons at above, the tubes must be gently heated and cooled. Excessive cooling or heating of the tubes or oxid placement and leakage at gasget contacts reduces the surface contact areas of the insulators with the corrosion by condensing water around the rubber insulation gasgets, it causes cooling liquid leakage or increasing humidity at the tube housing block via following serial failures of HV unit such as increasing amounts of the broken tube events. During the replacement of insulating gasgets, enough care should be taken for gasket contact points as oiling them with silicone grease as a form of the thin film. High responsibility must be with continuous result control and reference correlations on the scientific sample. With this way we can eliminate possible negative results by malfunctions on measurements.

