



## X-ray diffraction for investigation of engineering materials at FNSPE

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### **Abstract:**

The topics solved at FNSPE CTU in Prague using X-ray diffraction, both within the framework of fundamental and applied research projects and at the request of our foreign and contractual partners, are extremely diverse. For fundamental research projects, we can mention, e.g., the analysis of mechanical properties of functional thin layers within applied research projects such as laser hardening and welding, or a project dealing with vibrational corrosion. The X-ray diffraction laboratory at the Department of Solid State Engineering FNSPE CTU in Prague cooperates with other research organisations. For instance, it participates in the research of industrial partner, engaging the issue of oxidation kinetics of zirconium fuel cladding, increasing the safety of nuclear reactor operation. In these projects and collaborations, the influence of not only residual stresses but also phase composition, texture (crystal preferred orientation), and other real structure parameters on the useful properties of materials are investigated. The obtained knowledge is often immediately applicable in engineering practice. The results of the research proved that X-ray diffraction is a suitable tool to monitor and optimize the properties of various materials and, therefore, it is of great practical importance.