

SUMMARY

CORROSION OF ANCIENT GLASSES

Monument protection, conservation problems are gradually coming into new stage, by developing cooperation with the materials science. Cooperation between conservators and glass technologists has been developed in the Department of Glass Technology and Amorphous Coatings, at the Faculty of Materials Science and Ceramics in the University of Science and Technology. The main point of this activity was connected with estimation of influence of chosen factors acting on the glass produced in different periods of time. This necessity is connected with taking care of many ancient glasses with historical value, which have been destroyed due to the process of corrosion. This idea has been undertaken to prolong our cultural heritage. Glass as a material in spite of generally good chemical durability is going to deteriorate due to activities of special factors. Consequently, some of its properties can be changed, causing its lower value. Corrosion reasons are very complicated and depending on glass composition, thermal history and production style. From technological point of view, glass corrosion process depends on many factors, acting separately or together. Moreover interaction among displayed glasses plays important role in deterioration phenomenon, although it is very often neglected. To avoid such a situation, chosen glass must be tested with taking into consideration all outside factors. The main goal of this project is testing different ancient glasses in the technological aspects. Parallely, testing of prepared corroded sensors for these historical objects has been carried out too. Corrosion was induced in the media which can influence the chosen historical objects in conditions where they have been exposed. Comparing these results allows to draw conclusions about the nature of glass corrosion process, and to look for their reason. Different methods like SEM, EDS, TFIR, IR microscopy, AFM, Optical Interferometer, XRD, have been applied for testing glass features. It should be emphasized here, that up to now there is not any uniform method to test this process nor the unit to define its value unambiguously. That is why the more methods are applied the more data can be delivered. Elements of chosen ancient glasses have been borrowed from museum and tested by so called non-destructive methods. After analyzing process all of them been returned, to undergo conservation procedure. From technological point of view glasses originated from the III-rd to XVII-th century were very diverse and represented different surface stage, due to deterioration activity. Conclusions from these measurements have been used in renovation and conservation works. The applying of sensor glass method gave the chance to obtain unlimited amount of experimental material. They played important role in monitoring process of local conditions in museum show-cases, exposition and storage rooms. This gave a chance to precisely estimate place of exposition which is important to preserve good data for monument. They have to be considered in the process of keeping real value of our monuments and preserve our cultural heritage.

This research has interdisciplinary character and shows how important is cooperation of engineers, historians and conservators.