

THERMALLY INDUCED CHEMICAL WELDING OF EPOXY-BASED FILMS

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Chemical welding is a relatively new welding approach resulting from chemical reactions that occur at the interface opens the way towards assembly epoxy-based materials without adhesives or molds [1].

In the present work, colorless, highly transparent films ($s=0,487$ mm) generated by thiol-epoxy click reaction were chemically welded at 150°C for 60 min (Fig.). In this case, the welding is a result of transesterification reactions taking place at the overlapped part. The recovery of the material strength across the interface during the welding could be observed only across contacting surfaces (Fig.), while other surfaces remain non-sticky because of the very low equilibrium concentration of dissociated groups. It was demonstrated, that the welded sample had stress at break about 20 MPa and broke at bulk material. Thus, mechanical properties of welded joints are nearly equivalent to the basic material..

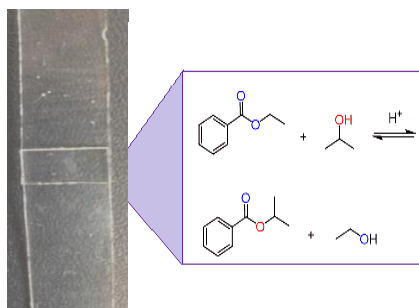


Fig. Epoxy-based film chemically welded through transesterification reactions

Funding: This research was funded by the National Academy of Sciences of Ukraine under the program No 6541230 for Young Scientist Laboratories (agreement No11/01-2020).

Reference:

1. Vakulenko I.O. Influence of chemical compounds on the forming of welding arc / I.O. Vakulenko, S.O. Plitchenko, D.M. Makarevich // Science and transport progress. – 2014. - №5. – P. 92-100