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NEW APPLICATION OF THE DIFFERENCE THERMAL ANALYSIS IN HEAVY--CURRENT ELECTROTECHNOLOGY

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Further possibility, which was verfied for DTA application in heavycurrent electrotechnology, is the possibility of isolation processing i. e. its technology level. Modern isolating systems of the large electric rotating machines as composed dielectrics contain a very important component - epoxide resins. The degree of their processing influences directly the isolation quality and electrical properties. Close relation of DTA results to other methods that are used in isolation quality tracing proved sufficiently the correctness of the DTA application in the sphere hitherto new for this method. Existing data obtained by DTA give very valuable information and help to increase the effectiveness of the production of isolations.

Modern isolating systems of large electrical rotating machines as multicomponent dielectrics contain a very important component - the bond in the form of epoxide resin. Quality of treatment, especially the bond hardening, influences directly the quality and electrical properties of the isolations. The application DTA was developed to serve for verifying the degree of technological treatment what is a very important factor in electrotechnology.

As we know, DTA is able to capture energy of reacting particles of the material. Using thermogram tracing we can describe the property development of studied materials for we may generally suppose that certain concentration of particles capable of reactive participation corresponds to each immediate state of material. We may generally suppose that ever the degree of assertion - the treatment of basic components of materials i. e. epoxide resins - - presents certain differences in reaction quantity of capable particles and consequently differences in the course of DTA.

The test verifying sufficiently above mentioned presumption consisted of performing DTA on materials hardened at different times. The used materials were glass fibres and bromepoxide resins. Analyses were carried out on the Stanton Redcroft Modular

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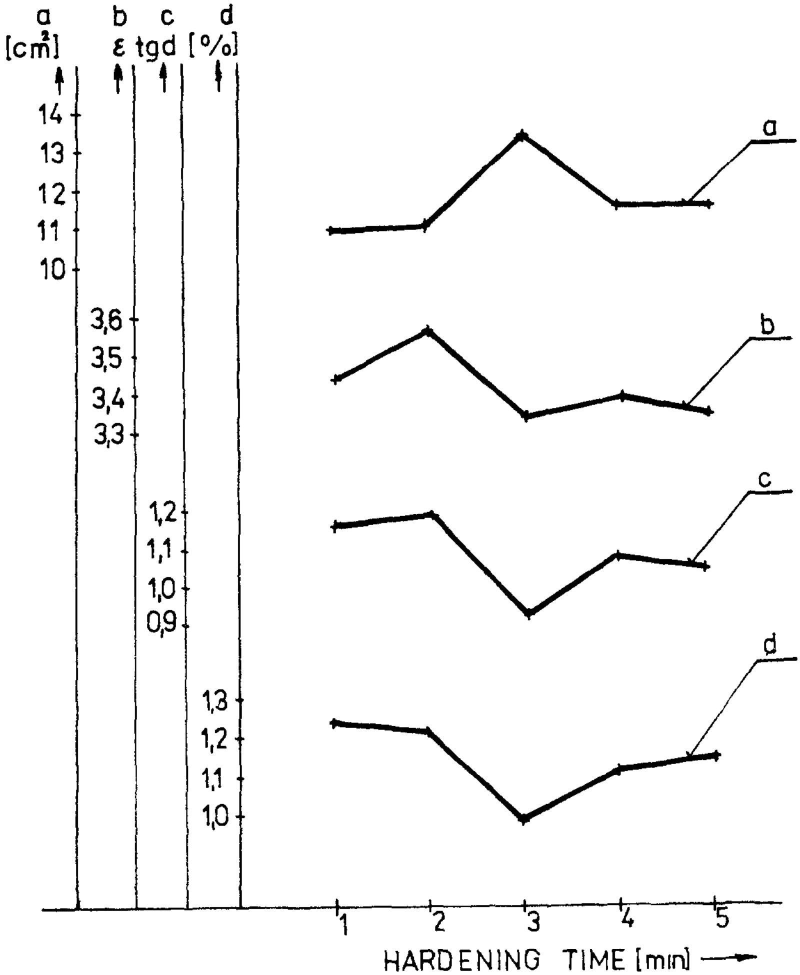

Thermoanalytic System by method described in report /1 . Plotting the size of thermoeffect area in dependence on the time of material hardening /dependence a/ we see that the maximum energy of reacting particles is number 3 for the hardening time.

Also the other properties of the material hardened in this way should be optimal. If we measure further parameters - permittivity /dependence b/, loss factor tg d /dependence c/ and the magnitude of nonreactive quotients of extractions /dependence d/ for conformably hardened samples, we can see the optimum correldence of these properties with the maximum for the parameter DTA. In this way we verify the optimum of material properties for the hardening time number 3. We also proved the tightness of DTA results to other methods. The value of correlated coefficient at tg d is 0,948 and with a number of nonreactive quotients of extractions - 0839.

Given results show that it is possible to determine well the degree and quality of treated material at the isolations with epoxide bond by DTA and to increase the effectiveness of their production.

Literature:

/1/ Mentlík, V.:
Thermal Analysis in the Diagnostics of High-Tension Isolations
VŠSE, Plzeň, 1979

/2/ Mentlík, V.:
Study of Hardening Processes of Epoxid Resins DTA, Termanal ´82