Elaboration and Investigation of the New Ecologically Clean Friction Composite Materials on the Basis of Nanoporous Raw Materials

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Abstract : The purpose of the article is to show the possibility for the development of a new generation, eco-friendly (asbestos free) nano-porous friction materials on the basis of Georgian raw materials, along with the determination of technological parameters for their production, as well as the optimization of tribological properties and the investigation of structural aspects of wear peculiarities of elaborated materials using the scanning electron microscopy (SEM) and Auger electron spectroscopy (AES) methods. The study investigated the tribological properties of the polymer friction materials on the basis of the phenol-formaldehyde resin using the porous diatomite filler modified by silane with the aim to improve the thermal stability, while the composition was modified by iron phosphate, technical carbon and basalt fibre. As a result of testing the stable values of friction factor (0.3-0,45) were reached, both in dry and wet friction conditions, the friction working parameters (friction factor and wear stability) remained stable up to 500 OC temperatures, the wear stability of gray cast-iron disk increased 3-4 times, the soundless operation of materials without squeaking were achieved. Herewith it was proved that small amount of ingredients (5-6) are enough to compose the nano-porous friction materials. The study explains the mechanism of the action of nano-porous composition base brake lining materials and its tribological efficiency on the basis of the triple phase model of the tribo-pair.

Keywords : brake lining, friction coefficient, wear, nanoporous composite, phenolic resin
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