Method for preparing a three-component polymer composite material includes activating a carbon fiber filler in a high-speed mill at a speed of n=7000 rpm^{-1} for 5 minutes, activating a dispersed mineral filler in a high-speed mill at a speed of n=7000 rpm^{-1}, activating a polytetrafluoroethylene (PTFE) powder in a high-speed mill at a speed of n=9000 rpm^{-1} for 5 minutes and mixing all the resulting ingredients. Wherein, kaolin is used as a dispersed mineral filler and is activated for 5 minutes, and the ingredients of the composition are mixed using a two-stage process, in which the first stage involves preparing two mixtures, the first of which consists of PTFE and carbon fiber filler in a 1:1 ratio, and the second consists of PTFE and kaolin in a 1:1 ratio, which are separately subjected to intensive mechanical activation in a high-speed mill at a speed of n=7000 rpm^{-1} for 5 minutes, and then, at the second stage, the resulting mixture is mixed with PTFE in a 1:4 ratio, resulting in a three-component composite material based on polytetrafluoroethylene.