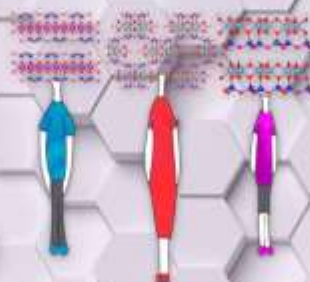
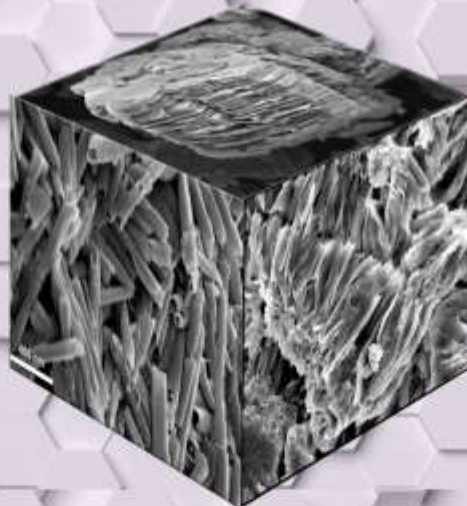
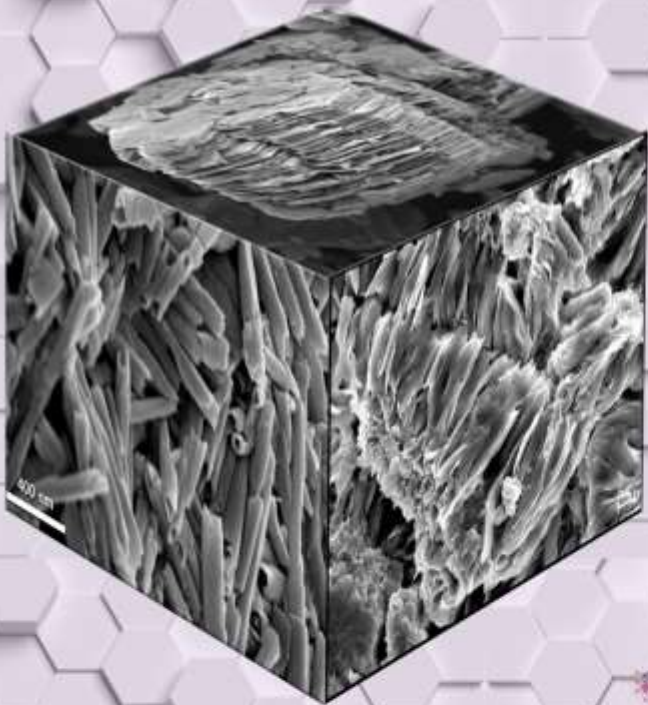


ANAIS



ARGILOMINERAIS E NANOCOMPÓSITOS: O PRESENTE, O PASSADO E FUTURAS APLICAÇÕES



FRANCA - SP



HYPERCONDUCTIVITY IN LAYERED SILICATES OF THE MICA GROUP

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Mica muscovite have been shown to be able to record the passage of swift particles as dark tracks produced by the precipitation of excess iron and grown by accretion. However, they were only a minority among the tracks observed in natural crystals of muscovite. Most of the tracks were along the close packed lines of the potassium layer and lacked the characteristic kinkiness due to Rutherford scattering of swift particles. They were predicted to be produced by energetic packets of energy, called quodons, travelling along the atom chains, It was confirmed experimentally by bombarding an edge of a specimen of muscovite and observing the ejection of an atom at the opposite side along close packed lines [1]. A review of the subject [2] observed that only the tracks of positive particles as protons, positrons and antimuons were recorded. The tracks of swift particles at low velocities were similar in thickness to the quodons, which led to the hypothesis that quodons were also able to carry electric charge. This was confirmed experimentally by measuring the electric currents in absent of an electric field when a specimen of muscovite was filled with quodons produced by alpha bombardment [3]. This phenomenon was called hyperconductivity. The present work presents experimental results on hyperconductivity in several layered silicates of the mica group: lepidolite, phlogopite and synthetic fluorphlogopite. Other silicates as biotite and quartz were also tested with negative results, showing that the layered structure is a necessary but not sufficient condition. Several new experiments were performed in the previous minerals and also in muscovite. They were able to detect new properties: the hypercurrent flowed a few seconds after irradiation was stopped, proving the long life of nonlinear excitations. The hypercurrent was also able to flow over defects and dislocations and even to anneal some of them. This was demonstrated by joined damaged surfaces and observing the recovery of the hypercurrent after some initial time. It was also shown that the hypercurrent was unaffected by magnetic fields up to one tesla. The use of hyperconductivity for technological application is under study.

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