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# The effect of size and amount of micro particles of cork on the toughness of an epoxy

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Epoxies are the most common structural adhesives due to their good mechanical, thermal and chemical properties. However, the structure of these thermoset polymers also causes brittleness, with a low resistance to the initiation of cracks and their propagation. The inclusion of particles (nano or micro) is a method to improve the mechanical properties such as toughness of structural adhesives [1]. Structural adhesives are known for their high strength and stiffness but also for their low ductility and toughness. There are many processes described in the literature to increase the toughness, being one of the most common the use of rubber particles [2]. In the present study, natural micro particles of cork are used with the objective to increase the toughness of a brittle epoxy adhesive. The idea is for the cork particles to act like as a crack stopper leading to more energy absorption. This fact occurs because cork presents a remarkable combination of properties (low density, low cost and sustainability of the raw material). The influence of the cork particle size and amount were studied. Particles of cork ranging from 75 to 250 µm were mixed in the adhesive Araldite 2020 from Huntsman. The amount of cork in the adhesive was varied between 0.5 and 2.5% in weight. The toughness of the adhesive was assessed through toughness measurements with three-point bending specimens.

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