



Rustworthy

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Rusting of iron is an undesirable problem which causes metal structures to be weakened and sometimes destroyed leading to economic loss.

Various preventative methods are often used for treating iron objects from rusting, but seldom do they focus on the remedy for rusted objects. The initial idea of our project 'Rustworthy' is to treat rusted iron objects instead of brand new ones, which is very important in the conservation of historical structures.

During our research, we discovered that tannic acid reacts with rust to form insoluble iron-tannate complex, which acts as a protective layer to prevent further rusting. Therefore, in our investigation, we optimized the concentration of tannic acid, the main ingredient to enhance the effectiveness of the coating. We also made improvement in the adhesion and smoothness of the coating by adding phosphoric acid and ethanol respectively.

The effectiveness of protective coating is determined by rust indicator test. The better the effect, the less blue area is observed. The adhesion of coating is determined by observing the appearance and scraping the surface. The optimum composition of our reagent 'Rustworthy' is 20 gdm-3 tannic acid, 0.71M phosphoric acid and 15% v/v ethanol.

Possible applications of "Rustworthy" are to apply on domestic ironware and to protect rusted iron antiques while preserving their original features.

The advantages of Rustworthy are, firstly, it can make use of rust to achieve self-sustaining protection against further rusting so as to achieve conservation and secondly, it is a safe and easy-to-use method to treat rusted objects.

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