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## **A Novel Method to Determine Oxidation Rates of Heritage Materials in Vitro and in Situ**

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### **Abstract:**

A novel method for measuring oxidation rates of heritage materials is described. The method uses optical oxygen sensors, which allow measurement of the oxygen concentration through the transparent wall of a closed container. Three experimental designs are described: first, using glass containers in which the samples can be followed for extended periods; second, using bags composed of oxygen barrier film that have flexible dimensions suitable for irregularly shaped artefacts; and third, using glass dishes glued to the surface of larger artefacts, allowing measurement of oxygen consumption in situ. The flexibility of the method is especially important in studies of heritage artefacts, where it is seldom possible to take subsamples which suit fixed container dimensions, and where it may be necessary to study oxidation over extended periods [years]. Ways to reduce the response time are also described.

Key-words: oxidation rates, decomposition, artefact conservation, flexible sample containers, no self-consumption, oxygen barrier film