

## **Substitute for methyl bromide gas to be used in the disinsectisation of heritage collections**

Schedule: research began in 2007

### **Programme description**

Since 1 January 2007, pursuant to Commission Directive 2006/140/EC of 20 December 2006, methyl bromide has been definitively abandoned as a biocidal fumigant in favour of sulphuryl fluoride as an active substance.

Two other substitute gases may eventually be considered: hydrogen phosphide (P.H.3) and dimethyl disulphide (D.M.D.S.).

A similar prohibition on the use of methyl bromide has also been raised in the area of heritage conservation, although we do not currently have access to specific and detailed information on the physico-chemical interaction of the three substitute gases with cultural heritage materials.

Every area of heritage conservation is affected by infestation problems and all of them – historical buildings and monuments, museum collections of all kinds, and library or archival materials – involve a wide variety of objects (altarpieces, furnishings, wall paintings, easel paintings, sculptures, manuscripts, coins and medals, typescripts, ethnographic objects, etc.) executed in every imaginable medium (wood, stone, textile, paper, parchment, metal, leather, etc.).

Infestation is a particularly thorny issue for historic buildings and their collections due to the difficulty in treating monuments in situ and the fact that objects are very often impossible to transport or dismantle.

The aim of this study will be to reveal any alterations that may be caused to materials by the different gases studied. Two types of materials, wood and stone (including painted plaster), frequently encountered in heritage conservation work, were selected as the focus of the study.

The selected experimental procedure involves the collection of samples representing the most commonly found ancient gilding techniques used in wall painting and painting on wood.

A quarter of the samples (84 on stone and 108 on wood) are not treated at all and thus serve as benchmarks, with the remainder divided into three groups, each of which is to be treated with one of the three gases. The samples are aged artificially, using both hygrothermal ageing and light ageing.

The gilded wood and gilded wall painting samples are subjected to various analyses: colourimetry, physico-chemical analyses of stratigraphic cross-sections, MEB-EDS, Raman and infrared spectrometry.

The raw metal pieces (30 samples) are mainly analysed using electrochemical processes.

## **Partners**

CICRP: Project coordination and analysis of wood samples

IRAMAT-CRP2A, Maison de l'Archéologie, Université Bordeaux III: Analysis of wall painting samples

Materia Viva (Toulouse): Analysis of metal samples