

RESEARCH INTO THE COMPOSITION OF MATERIALS USED FOR THE  
CONSTRUCTION OF THE ARTWORK *DOPPELGARAGE*  
BY THOMAS HIRSCHHORN

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Method: FTIR microspectrometry

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## INTRODUCTION

Thomas Hirschhorn used adhesive tape in a dominant way, for example, as a constructive element and a surfacing agent for numerous objects or as a moulding mass to form lamellae of oversized mushrooms. In many cases, he covered the adhesive tape with paint. Unfortunately, this paint has started to flake and there are already innumerable losses. The goal of the following research was to clarify certain aspects of the material composition that are responsible for this change in the artwork.

## RESEARCH QUESTIONS

- What is the carrier material of the transparent adhesive tape?
- What is the brown-coloured binder of the adhesive tape?
- What is the binding medium of the red paint?
- Why is the paint layer flaking away?

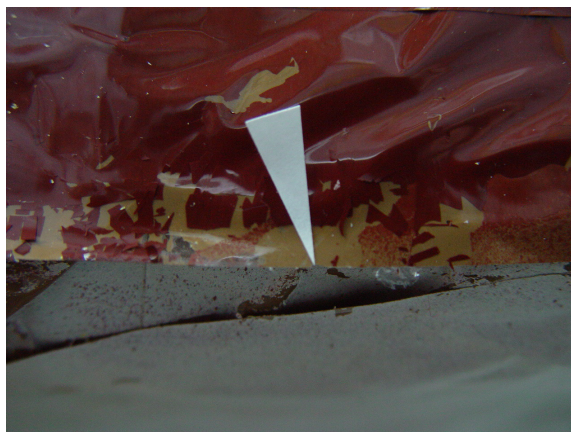
## SAMPLES

### Description

1. Adhesive tape consisting of a transparent carrier foil coated with brown adhesive.
2. Red spray paint.

### Location

Both samples were taken from the edge of the mushroom next to the wall, Pedestal "North Western"



## RESULTS

Sample No	Description/Place	Appearance	FTIR analysis
1.	adhesive tape carrier	flexible, transparent foil	<b>polypropylene</b>
	adhesive on tape	sticky, viscous liquid	<b>acrylic</b>
2.	red paint	brittle	?

Method: FTIR microspectrometry (diamond disk, transmission)

Instrument: Fourier-Transform infrared microspectrometer ( $\mu$ -FTIR)

Interferometer: Perkin Elmer System 2000

Range: 650 - 8000  $\text{cm}^{-1}$  (KBr beamsplitter and MCT detector)

Number of scans: 16

## SUMMARY

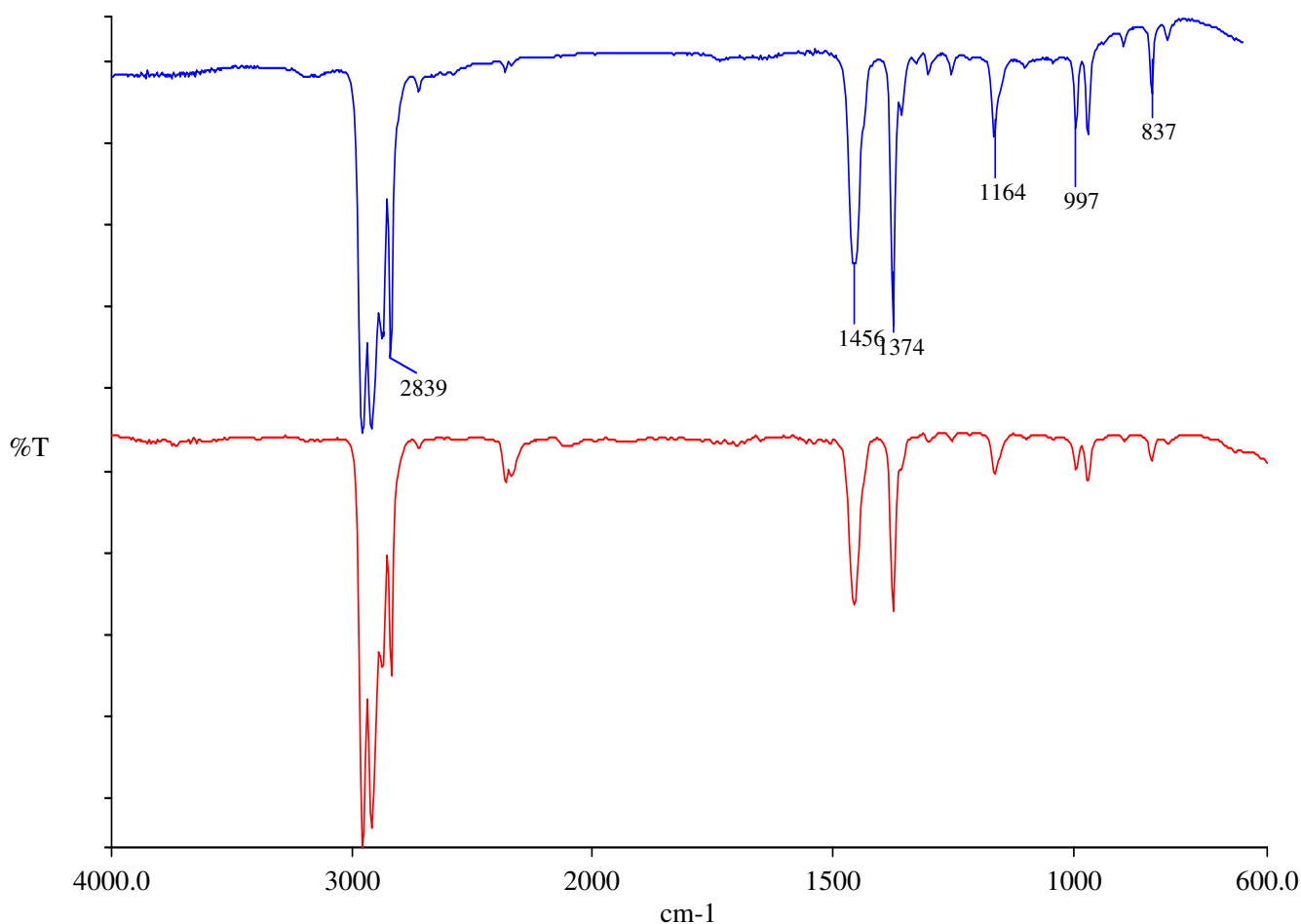
The adhesive tape consists of a polypropylene carrier and an acrylic binder. The tape will predictably become more brittle on exposure to light. The main reason for the flaking of the paint is probably the nonpolar surface of the polypropylene. Owing to the molecular structure of polypropylene, the red paint layer has extremely limited adhesion to the carrier. An analysis of the paint and the adhesive tape did not indicate whether a primer (and what kind?) was applied to the tape surface before the red paint was sprayed on.

## APPENDIX SPECTRA

Sample 1

Upper spectrum: adhesive tape carrier

Lower spectrum: reference spectrum of polypropylene

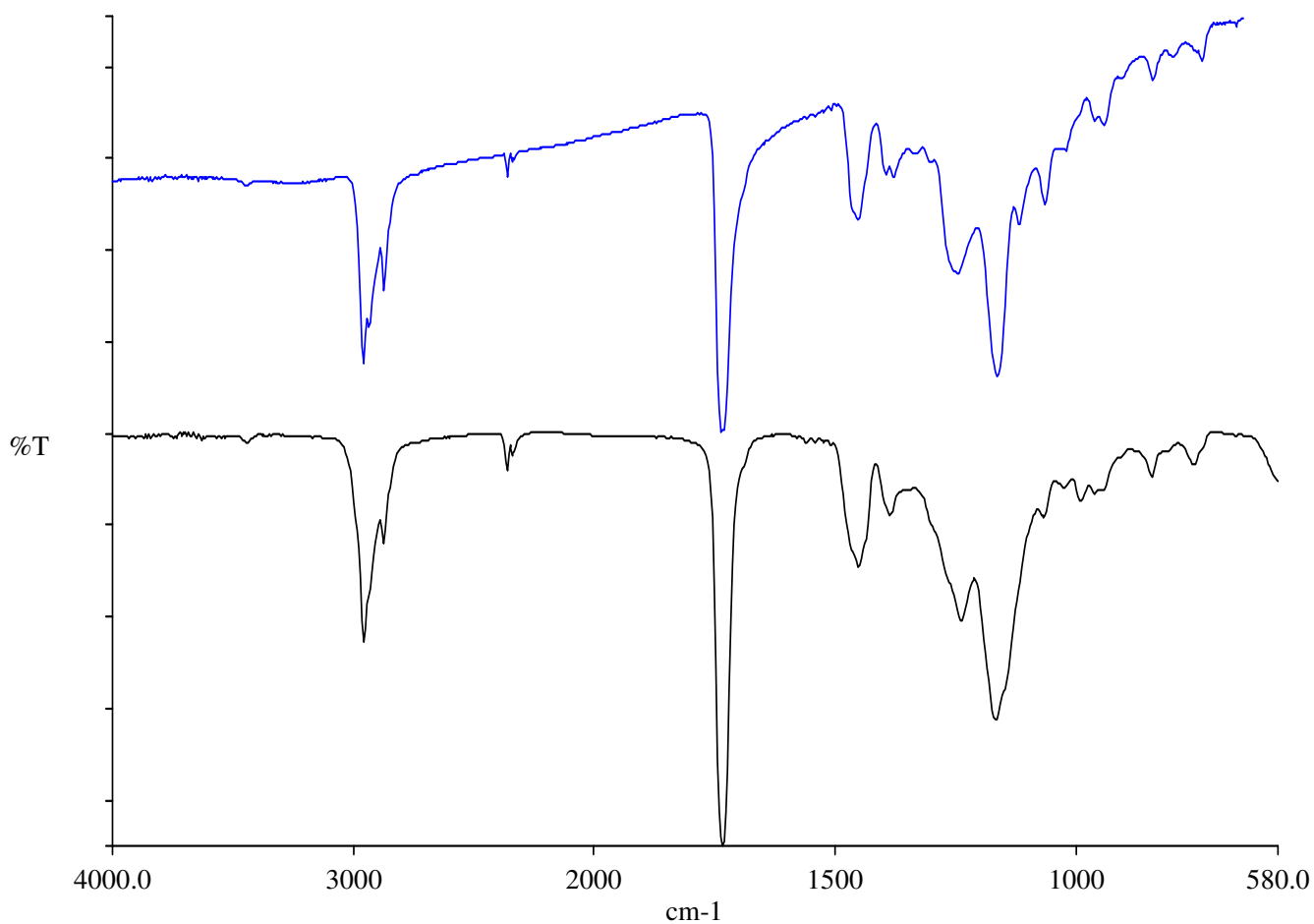


### Results

The sample of carrier could clearly be identified as polypropylene.

2960 cm<sup>-1</sup> asymmetric CH<sub>3</sub>, 2840 cm<sup>-1</sup> symmetric CH<sub>2</sub>, 1460 cm<sup>-1</sup> attributed to CH<sub>2</sub> or CH<sub>3</sub>, deformation vibrations at 1374 cm<sup>-1</sup>, attributed to aliphatic C-H bonds.

Upper spectrum: tape adhesive  
Lower spectrum: reference spectrum of Lascaux 498 HV



#### Results

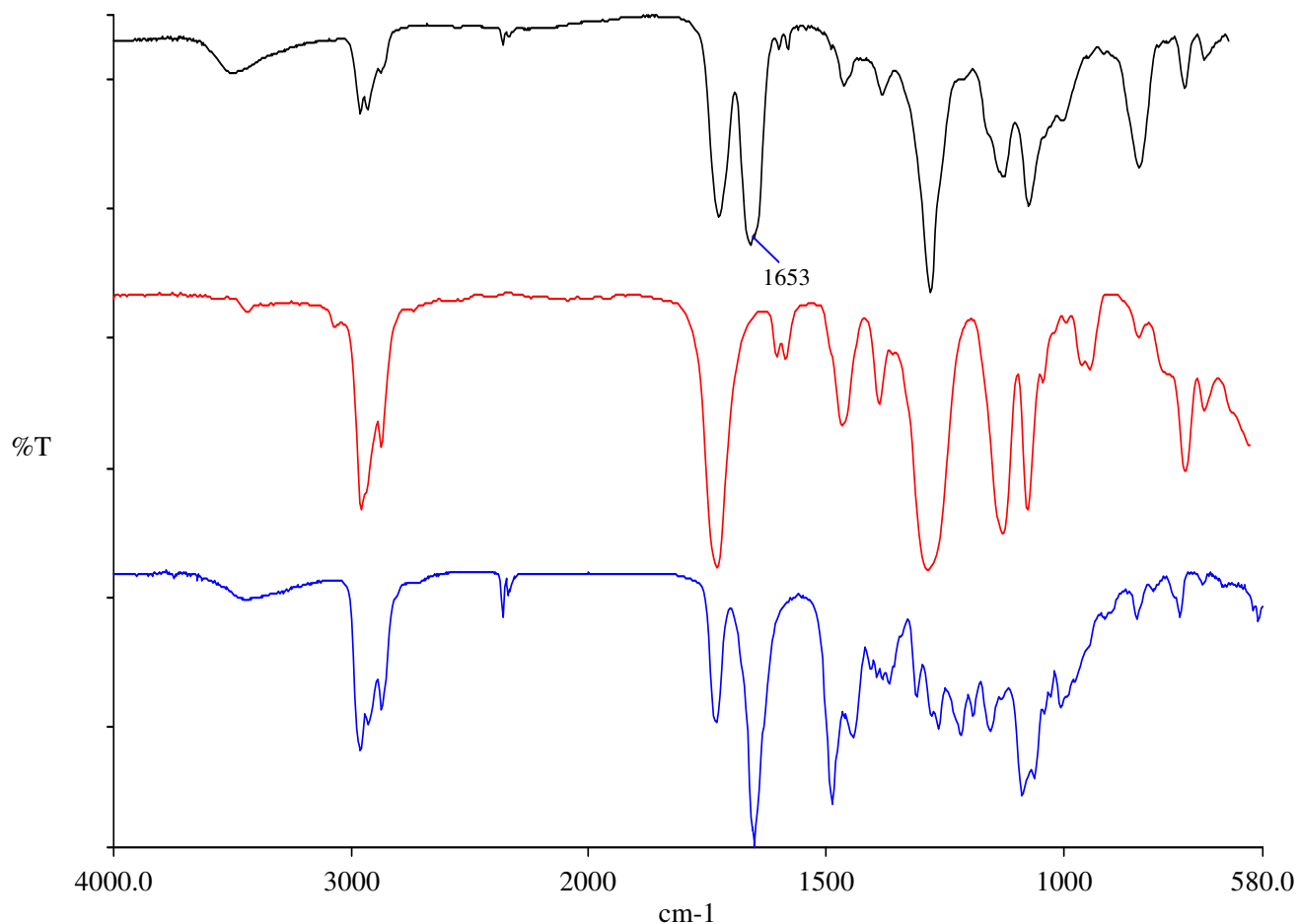
The spectra of the adhesive indicates that it is probably a water-based acrylic:  
1730 cm<sup>-1</sup> carbonyl groups, 1260 cm<sup>-1</sup> und 1190-1150 cm<sup>-1</sup> characteristic acrylic bond, peak at 3000 cm<sup>-1</sup> is attributed to C-H or O-H vibrations.

Sample 2

Upper spectrum: red spray paint

Middle spectrum: reference spectrum of dibutyl phthalate

Lower spectrum: reference spectrum Laropal A 81, an aldehyde resin



Results

The spectrum of the red paint could not be assigned. Its general pattern corresponds to the spectra of dibutyl phthalate and an aldehyde resin. The red paint requires further analysis, including comparisons with other reference spectra.

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