

## Title (en)

A METHOD OF REMOVING A WAX-RESIN ADHESIVE FROM THE CANVASES OF WAX-RESIN LINED PAINTINGS, A CLEANING MIXTURE AND AN ORGANOGEL FOR USE IN THIS METHOD AND THE METHOD OF PRODUCING THIS ORGANOGEL

## Title (de)

VERFAHREN ZUM ENTFERNEN VON WACHSHARZKLEBSTOFF AUS WACHSHARZLACKEN, REINIGUNGSMISCHUNG UND ORGANOGEL ZUR VERWENDUNG IN DIESEM VERFAHREN UND VERFAHREN ZUR HERSTELLUNG DIESES ORGANOGELS

## Title (fr)

PROCÉDÉ D'ÉLIMINATION D'ADHÉSIF À BASE DE CIRE ET DE RÉSINE SUR DES TOILES REVÊTUES DE CIRE-RÉSINE, MÉLANGE DE NETTOYAGE ET ORGANOGEL DESTINÉ À ÊTRE UTILISÉ DANS CE PROCÉDÉ ET PROCÉDÉ DE PRODUCTION DE CET ORGANOGEL

## Publication

**EP 4164895 B1 20240131 (EN)**

## Application

**EP 21756082 A 20210614**

## Priority

- PL 43429920 A 20200612
- PL 2021000044 W 20210614

## Abstract (en)

[origin: WO2021251840A1] A cleaning mixture for dissolving a wax-resin lining adhesive and removing it from the canvases of wax-resin lined paintings, containing organic solvents, is characterised in that it contains an alcohol component, a hydrocarbon component and a ketone component forming together an AHK mixture (alcohol/hydrocarbon/ketone), which is chemically inert towards polymerised oils present in the painting and has physicochemical properties determined by Teas parameters:  $fd = 67 \div 69$  (dispersion force),  $fp = 11 \div 19$  (polar force) and  $fh = 15 \div 21$  (hydrogen bonding forces), characteristic of the area common to waxes, natural resins and synthetic resins. According to the invention, the cleaning mixture contains 30-40 vol.% of the alcohol component, 40-50 vol.% of the hydrocarbon component and 15-25 vol.% of the ketone component. A nanocomposite organogel pNIPA-LAP-AHK containing nanoporous polymer matrix pNIPA-LAP with a structure based on poly(N-isopropylacrylamide) containing Laponite XLS (92.32 wt.% of  $Mg_5.34Li_0.66Si_8O_{20}(OH)_4Na_{0.66}$ , 7.68 wt.%  $Na_4P_{20}$ ) as crosslinking agent, filled with the AHK cleaning mixture (alcohol/hydrocarbon/ketone) described above. The method of manufacturing the nanocomposite organogel pNIPA-LAP-AHK, is characterised in that the process of free radical polymerisation is carried out where Laponite XLS is mixed with water and sonicated until a clear solution obtained and further mixed with N-isopropylacrylamide, and then the mixture is stirred and subjected to deoxidation in an ice bath for ca. 1 h followed by the addition of the accelerator of the free radical polymerisation process, and the solution obtained is transferred to the molds and left to react, and after 24 h the hydrogel obtained is several times rinsed with water to remove the unreacted reactants, dried to constant mass and then inserted into the AHK (alcohol/hydrocarbon/ketone) cleaning mixture described above and left to swell, to receive the pNIPA-LAP-AHK organogel. A method of removing a wax-resin lining adhesive from the canvases of wax-resin lined paintings, considering dissolution and removal of the adhesive with a cleaning preparation containing a carrier and a solvent, is characterised in that to dissolve and remove the wax-resin lining adhesive the pNIPA-LAP-AHK organogel described in claim 9 is used, comprising the AHK cleaning mixture (alcohol/hydrocarbon/ketone) described above, where said mixture is immobilised in the nanocomposite polymer matrix pNIPA-LAP described above, with shape corresponding to the portion of the treated canvas, being the support of the painting, wherein the organogel is applied on the surface of the treated canvas and is allowed to stay in contact with the reverse of the painting for at least 20 minutes to extract the wax-resin adhesive towards the cleaning mixture immobilised in the organogel, and then the organogel is being removed from the surface of the treated canvas and subjected to regeneration by its immersion in the fresh portion of the cleaning mixture to wash of the extracted wax-resin adhesive of the organogel, and then this procedure is being repeated using the regenerated organogel until the wax-resin adhesive completely removed from the reverse of the painting, even from the hollows between the weaves of the canvas being the support of the painting. The invention guarantees a reduction in the harmfulness and toxicity of the process of removal of wax-resin lining adhesive in comparison to the classical solvent methods, thanks to the use of non-toxic solvents and embedding them in a gel carrier. At the same time, the invention is safe for the cleaned canvas and painting. A single local application of the preparation allows for the removal of wax-resin adhesive from the reverse of the painting. The transparency of the gel enables visual control of the reverse during the extraction process, which does not require the use of high temperature or vacuum, which could harm the work of art being cleaned. Use of pNIPA-LAP-AHK organogel allows for complete removal of wax-resin adhesive from the reverse of painting, leaving clean canvas ready for relining.

## IPC 8 full level

**B44D 7/00** (2006.01); **B08B 3/08** (2006.01); **C11D 7/50** (2006.01); **C11D 17/04** (2006.01)

## CPC (source: EP)

**B44D 7/00** (2013.01); **C11D 7/5022** (2013.01); **C11D 7/5027** (2013.01); **C11D 17/041** (2013.01)

## Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

## DOCDB simple family (publication)

**WO 2021251840 A1 20211216**; EP 4164895 A1 20230419; EP 4164895 B1 20240131; EP 4164895 C0 20240131; PL 4164895 T3 20240415; PL 434299 A1 20211213

## DOCDB simple family (application)

**PL 2021000044 W 20210614**; EP 21756082 A 20210614; PL 21756082 T 20210614; PL 43429920 A 20200612