

**Matériaux et méthodes pour le décrassage des surfaces et le retrait des films vieillis**

**Session de formation permanente organisée par le département des restaurateurs**

**avec Paolo Cremonesi, docteur en chimie, spécialiste en conservation-restauration**

**Aubervilliers, 8-9-10 novembre 2023**

**Orientations bibliographiques réalisées par la bibliothèque de l’Inp**

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**Programme Modulaire de Nettoyage : histoire & principe**

DESVOIS Laetitia, *Le Programme de Nettoyage Modulaire, une approche systématique de décrassage des couches picturales : étude, analyse et application de la méthode*, Paris, Université Paris I Panthéon Sorbonne, 2009, 107 p.

DESVOIS Laetitia, CRIOLLO Andrea, « The modular cleaning program: An approach for treating oil stains on paper? », *Journal of Paper Conservation*, Vol. 14 (2013), n° 1, p. 16-20

SLOTTVED KIMBRIEL C., ROSE J., « The Modular Cleaning Program: First Impressions from a Four- day Course and Subsequent Implementations », *The Picture Restorer*, Issue 50, p.18-26

(Version condensée dans *WAAC Newsletter* 2017, vol. 39, n° 2, p. 22-28)

STAVOUDRIS Chris, « Azeotropes from A to Z » [en ligne], *WAAC Newsletter*, 2006, vol. 28, n° 3, p. 14-17

< <http://cool.conservation-us.org/waac/wn/wn28/wn28-3/wn28-304.pdf>> (consulté le 2 novembre 2023)

STAVROUDIS Chris, DOHERTY Tiarna, « The Modular Cleaning Program in Practice: Applications to Acrylic Paintings », In *New insights into the cleaning of paintings [conference preprints (abstracts), Universitad politécnica de Valencia, may, 26th-28th 2010]*. Marion F. MECKLENBURG et al. (eds), Valencia : Universidad politécnica de Valencia = Universitat politécnica de Valencia, 2010, p. 139-145

STAVROUDIS Chris, DOHERTY Tiarna, WOLBERS Richard C., « A new approach to cleaning I: using mixtures of concentrated stock solutions and a database to arrive at an optimal aqueous cleaning system » [en ligne], *WAAC Newsletter,* 2005, vol. 27, n° 2, p. 17- 28

< <http://cool.conservation-us.org/waac/wn/wn27/wn27-2/wn27-205.pdf>> (consulté le 2 novembre 2023)

STAVROUDIS Chris, DOHERTY Tiarna, WOLBERS Richard C., « A Novel Approach to Surface Cleaning: Using Mixtures of Concentrated Stock Solutions and a Database to Arrive at an Optimal Cleaning System », In *Oberflächenreinigung - Material und Methoden = Surface Cleaning - Material and Methods: Beiträge der Tagung "Oberflächenreinigung - Material und Methoden", Düsseldorf, 29 September bis 4. Oktober 2003*, Cornelia Weyer et al. (eds), Bonn: Verband der Restauratoren (VDR) Stuttgart : Konrad Theiss Verlag, 2006, p. 68-81

**Théorie de la solubilité aqueuse**

BARTON, A.F.M., *CRC Handbook of Solubility Parameters and other Cohesion Parameters*, Boca Raton (Floride): C. R. C. Press, 1983, 594 p.

BURKE John, « Solubility Parameters: Theory and Application » [en ligne], in *The AIC Book and paper group annual* – 3, Washington, DC, AIC, Book and Paper Group, 1984, p. 13-18

< [Solubility Parameters: Theory and Application (culturalheritage.org)](https://cool.culturalheritage.org/coolaic/sg/bpg/annual/v03/bp03-04.html) > (consulté le 2 novembre 2023)

FELLER R. L. « Solubility Parameters », *The International Institute for Conservation of Historic and* *Artistic Works - Bulletin of the American Group*, 1968, Volume 8, Number 2, p. 20-24

HANSEN Charles M., *Hansen Solubility Parameters: A User’s Handbook*, Boca Raton: CRC Press, 2nd rev. ed. (Reimp. de 2007), [25]-519 p.

HEDLEY Gerry, « Solubility Parameters and Varnish Removal: A Survey », In *Measured opinions: Collected papers on the conservation of paintings*, Gerry HEDLEY, Caroline VILLERS (eds), Gainsbourgh: United Kingdom Institute for Conservation (UKIC), 1993, p. 128ss.

MCGLINCHY Christopher, « Boundaries of the Teas Solubility Concept » [en ligne], *WAAC Newsletter*, 2002, vol. 24, n° 2, p. 17-19

< <http://cool.conservation-us.org/waac/wn/wn24/wn24-2/wn24-205.html>> (consulté le 2 novembre 2023)

PHENIX Alan, « Solubility Parameters and the Cleaning of Paintings: an update and review », *Kunsttechnologie Konservierung*, Heft 2, Jahrgang 12, 1998, p. 387-409

**Le vieillissement des matières organiques**

BOON J.J., PEULVÉ L., VAN DEN BRINK F. et al., « Molecular aspects of mobile and stationary phases in ageing tempera and oil paint films », In *Early Italian Paintings Techniques and Analysis, Symposium, Maastricht 1996,* Maastricht, Limburg Conservation Institute, 1997, p. 35-56

Burnstock Aviva, Learner Tom, « Changes in the surface characteristics of artificially aged mastic varnishes after cleaning using alkaline reagents », *Studies in Conservation*, August 1992, Vol. 37, n° 3, p. 165-184

KHANDEKAR Narayan, PHENIX Alan, SHARP Julia, « Pilot study into the effects of solvents on artificially aged egg tempera films », *The Conservator*, 1994, 18, p. 62-72

**PH et conductivité des surfaces peintes**

DILLON Courtney E., LAGALANTE Anthony, WOLBERS Richard C., « Acrylic emulsion paint films: The effect of solution pH, conductivity, and ionic strength on film swelling and surfactant removal », *Studies in Conservation*, Janvier 2014, Vol. 59 n° 1, p. 52-62

DORMAN Nicholas, « Conference Review: The Cleaning of Acrylic Paint Surfaces 3, London Workshop – A space-time continuum of pH and conductivity » [en ligne], *WAAC Newsletter*, 2012, vol. 34, n° 3, p. 18-23

< <http://cool.conservation-us.org/waac/wn/wn34/wn34-3/wn34-305.pdf>> (consulté le 2 novembre 2023)

GAROFANO MORENO Isabel, « Materiales organicos naturales presentes en pinturas y policromias. Naturaleza, usos y composicion quimica », *Revista ph*, novembre 2011, n° 80, p. 57-71

**Nettoyage des peintures : méthodes aqueuses**

CREMONESI Paolo, *L'ambiente acquoso per la pulitura di opere policrome*, Padova, Il Prato, 2011, 108 p. (I Talenti. Metodologie, tecniche e formazione nel mondo del restauro, 20)

CREMONESI Paolo, « Combination of a liquid-dispensing and micro-aspiration device for the cleaning of sensitive painted surfaces », *Studies in Conservation*, juillet-aout 2018, Vol. 63, n° 5-6, p. 315-325

CREMONESI Paolo (ed.), *Materiali tradizionali ed innovati nella pulitura dei dipinti e delle opere policrome mobili. Atti del convegno, Piazzola sul Brenta, 25-26 ottobre 2002*, Padova, Il prato, 2003, 96 p.

CREMONESI Paolo, HERITIER Pierre-Antoine*, Un approccio innovativo alla pulitura di superfici dipinte sensibili : la combinazione simultanea di erogazione controllata di liquido e micro-aspirazione = Une approche innovante de nettoyage des surfaces sensibles : utilisation simultanée d'un système de micro-aspiration et d'un apport contrôlé de liquide*, Padova, Il prato, 2017, 144 p.

CREMONESI Paolo, *Tensioattivi e chelanti per il trattamento di opere policrome*, Padova, Il prato, 2021, 239 p.

FELLER Robert L., STOLLOW Nathan, JONES Elizabeth H., *On Picture Varnishes and Their* *Solvents*, Washington D.C.: National Gallery of Art, 1985, XXIV-260 p.

FUSTER LOPEZ L., CHAROLA A.E., MECKLENBURG Marion F. et al., *Cleaning 2010: New insights into the cleaning of paintings:* [conference preprints (abstracts), Universitat politécnica de Valencia, May 26th-28th 2010], Valencia, Universidad politécnica de Valencia, 2010, 108 p.

HACKNEY S., TOWNSEND Joyce H., EASTAUGH N., *Dirt and Pictures Separated,* London: United Kingdom Institute for Conservation (UKIC), 1990, 56 p.

\*KANEGSBERG B., KANEGSBERG E., *Handbook for Critical Cleaning*, Boca Raton: CRC Press, LLC, 2001

KHANDEKAR Narayan, « A survey of the conservation literature relating to the development of aqueous gel cleaning on painted and varnished surfaces », *Reviews in Conservation*, 2000, n°1, p. 10-20

LEANER Thomas J.S., *Analysis of modern paints*, Los Angeles, Cal.: The Getty conservation institute, 2004, VI-210 p.

\*LEANER Thomas J.S., ORMSBY B., « Cleaning Concerns for Acrylic Emulsion Paints », In *The Conservation of Easel Paintings*, STONER J.H., RUSHFIELD R. (eds), London New York, N.Y.: Routlege, 2012, p. 564-570

LEANER Thomas J.S., SMITHEN Patricia, KRUEGER Jay W. (eds), *Modern Paints Uncovered: Proceedings from the Modern Paints Uncovered Symposium, May 16-19,* *2006, Tate Modern, London*, Los Angeles: Getty Publications, 2007

*Materiali Tradizionali ed Innovativi nella Pulitura dei Dipinti e delle Opere Policrome Mobili, primo Congresso Internazionale Colore e conservazione – Materiali e Metodi nel Restauro delle Opere Policrome Mobili, atti del Convegno Piazzola sul Brenta (PD), 25-26 Ottobre 2002*, Padova, Il Prato, 2003

MICHALSKI S., « A physical model of varnish removal from oil paint », In *Cleaning, Retouching, and Coatings. Technology and Practice for easel paintings and polychrome sculpture. Preprints of the Contributions to the Brussel Congress, 3-7 September*, London, International Institute for Conservation of Historic and Artistic Works, 1990, p. 85-93

PHENIX Alan, WOLBERS Richard, « Removal of Varnish: Organic Solvents as Cleaning Agents », In *The Conservation of Easel Paintings*, STONER Joyce Hill, RUSHFIELD Rebecca (eds), London New York, N.Y.: Routledge, 2012 (Routledge Series in Conservation and Museology), p. 524-554

PHENIX Alan, « The Swelling of Artists’ Paints in Organic Solvents, Part 1, A Simple method for measuring the in-plane swelling of unsupported paint films », *Journal of the American Institute for Conservation*, 2002, vol. 41, n° 1, p. 43-60

PHENIX Alan, « The Swelling of Artists’ Paints in Organic Solvents, Part 2, Comparative swelling powers of selected organic solvents and solvent mixtures», *Journal of the American* *Institute for Conservation*, 2002, vol. 41, n° 1, 61-90

Postec Marie, « De l'intérêt des compresses de gels solvants dans le nettoyage des couches picturales. Une expérience pratique = Omtrent het belang van solventgelcompressen bij de reiniging van verflagen. Een praktische ervaring », *Bulletin APROA-BRK*, 2ème trimestre 2008, n° 2, p. 17-23

SONCK Emilie, *Les peintures à l'huile sans couche de protection : approche de la problématique du nettoyage par l'étude des méthodes aqueuses*, mémoire, Bruxelles, Ecole Nationale Supérieure des Arts Visuels de la Cambre, 2007

STAVROUDIS Chris, « Gels: Evolution in Practice », In ANGELOVA Lora (ed), *Gels in the Conservation of Art,* London, Archetype Publications, 2017, p. 209-217

STULIK Dusan C., KHANJIAN Herant, DORGE Valerie et al., « Scientific investigation of surface cleaning processes: quantitative study of gel residue on porous and topographically complex surfaces », In *ICOM, 13Th triennial meeting Rio de Janeiro, 22-27 September 2002*, London: James & James, 2002, p. 245-251

Sutherland Ken, *Solvent extractable components of oil paint films,* Ph.D. Thesis, University of Amsterdam. Amsterdam FOM Institute for Atomic and Molecular Physics, 2001

TSANG Jia-Sun, ERHARDT David, « Current Research on the Effects of Solvents and Gelled and Aqueous Cleaning Systems on Oil Paint Films », *Journal of the American Institute for Conservation*, 1992, vol. 31, n° 1, p. 87-94

WOLBERS Richard C., « Recent developments in the use of gel formulations for the cleaning of paintings », in *Restoration'92 - Preprints to the conference held at the RAI international exhibition and congress centre, Amsterdam, 20-22 October 1992*. Ed. TODD Victoria, London, UKIC, 1992, p. 74-75

WOLBERS Richard C., « Un approccio acquoso alla pulitura dei dipinti », *Quaderni CESMAR7*, 2004, n°1

WOLBERS Richard C., *Cleaning painted surfaces, aqueous methods*, London, Archetype Publications, 2000, 198 p. Trad. it. [*La Pullitura di superfici dipinte : metodi acquosi*], Saonara, Il Prato, 2005. Trad. fr. [*Le nettoyage des surfaces peintes : méthodes aqueuses*] MIRABAUD Sigrid, DESVOIS Laetitia sous la direction de PALMADE-LE DANTEC Nathalie, Paris, Eyrolles / Institut national du patrimoine (Inp), 2013

WOLBERS Richard C., STAVROUDIS Chris, « Aqueous Methods for the Cleaning of Paintings », In *The Conservation of Easel Paintings*, STONER Joyce Hill, RUSHFIELD Rebecca (eds), London New York, N.Y. : Routledge, 2012 (Routledge Series in Conservation and Museology), p. 500-523

WOLBERS Richard C., STAVROUDIS Chris, « The Cleaning of Paintings », In KANEGSBERG Barbara, KANEGSBERG Edward, *Handbook for Critical Cleaning, second edition Volume 2: Applications, Processes and Controls*, Boca Raton: CRC Press, 2011

**Nettoyage des peintures : solvants & émulsions**

BLANK Sharon, STAVROUDIS Chris, « Solvents and Sensibility » [en ligne], *WAAC Newsletter*, vol.11, n° 2, 1989, p. 2-10

< [http://cool.conservation-us.org/waac/wn/wn11/wn11-2/wn11-202.html >](http://cool.conservation-us.org/waac/wn/wn11/wn11-2/wn11-202.html%20%3E%20) (consulté le 2 novembre 2023)

BURNSTOCK Aviva, KIESLICH Tanya, « A study of the clearance of solvent gels used for varnish removal from paintings », in *ICOM Committee for Conservation, 11th Triennial Meeting, Edinburgh, Scotland, 1-6 September 1996,* Londres, James and James, 1996, p. 253-262

CAMPANI Elisa, CASOLI Antonella, CREMONESI Paolo, *L'uso di Agarosio e Agar per la preparazione di "gel rigidi" = Use of Agarose and Agar for preparing "rigid gels"*, Saonara, Il prato, 2007, 52 p. (I Quaderni del CESMAR7, 4)

CASOLI Antonella, CREMONESI Paolo, CATALINI Piera, et al., « Studio anallitico dei solventi organici impiegati nella rimozione di adesivi sulle plastiche », in *Lo Stato dell'arte*.  XI congresso nazionale IGIIC: volume delle atti : Bologna, Accademia Delle Belle Arti, 10-12 ottobre 2013, p. 35-42

CREMONESI Paolo, *L'Uso dei solventi organici nella pulitura di opere policrome*, Saonara, Il Prato, 2004, 166 p. (I Talenti. Metodologie, tecniche e formazione nel mondo del restauro, 7)

CREMONESI Paolo, SIGNORINI Erminio, « L'uso dei solventi organici neutri nella pulitura dei dipinti: un nuevo test di solubilità », *Progetto restauro*, 2004, n° 31, p. 2-15

DALE SMITH Gregory, JOHNSON Ronald, « Strip 'Teas'. Solubility data for the removal (and application) of low molecular weight synthetic resins used as inpainting media and picture varnishes » [en ligne], *WAAC Newsletter*, Janvier 2008, Vol. 30, n° 1, p. 11-19

<https://cool.culturalheritage.org/waac/wn/wn30/wn30-1/wn30-105.pdf> (consulté le 2 novembre 2023)

DAUCHOT-DEHON Michèle, « Les effets des solvants sur les couches picturales. Alcools et acétone », *Bulletin de l'IRPA*, 1973, n° 14, p. 89-104

DORGE Valerie (ed), *Solvent gels for the cleaning of works of art, the Residue Question,* Los Angeles, The Getty Conservation Institute, 2004, XI-160 p.

FELLER Robert L., STOLLOW Nathan, JONES Elizabeth H., *On Picture Varnishes and Their*

*Solvents*. Washington D.C.: National Gallery of Art, 1985, XXIV-260 p.

FORD Bruce, BYRNE Allan, « The lipid stripping potential of resin soap gels used for cleaning oil paintings » [en ligne], *AICCM Bulletin*, 1991, vol. 17, n° 1 et 2, p. 51-60 <[http://www.tandfonline.com/doi/abs/10.1179/bac.1991.17.1-2.004>](http://www.tandfonline.com/doi/abs/10.1179/bac.1991.17.1-2.004%3E%20) (consulté le 2 novembre 2023)

HEDLEY Gerry, ODLYHA M., BURNSTOCK Aviva, TILLINGHAST JHUSBAND C., « A study of the mechanical and surface properties of oil paint films treated with organic solvents and water », in *Measured opinions : Collected papers on the conservation of paintings*, Gerry HEDLEY, Caroline VILLERS (eds), Gainsbourgh : United Kingdom Institute for Conservation (UKIC), 1993, p. 103-111

KHANDEKAR Narayan, « A survey of the conservation literature relating to the development of aqueous gel cleaning on painted and varnished surfaces », *Reviews in Conservation*, 2000, n°1, p.

10-20

MASSCHELEIN-KLEINER Liliane, « Remarques sur l'utilisation des solvants en conservation », *Conservation Restauration*, 1988, n°9, p. 28-33

MASSCHELEIN-KLEINER Liliane, *Les solvants*, Bruxelles, Institut Royal du Patrimoine Artistique, 1981, 129 p. [Cours de conservation, T. 2]

\*ODEGARD N., CAROLL S., ZIMMT W., « Chemical Safety », in *Material Characterization Tests for*

*Objects of Art and Archeology*, London: Archetype Publications, 2000, p. 7-17

PHENIX Alan, WOLBERS Richard, « Removal of Varnish: Organic Solvents as Cleaning Agents », in *The Conservation of Easel Paintings*, STONER Joyce Hill, RUSHFIELD Rebecca (eds), London New York, N.Y. : Routledge, 2012 (Routledge Series in Conservation and Museology), p. 524-554

PHENIX Alan, « Solvent Abuse.  Some observations on the safe use of solvents in the cleaning of painted and decorated surfaces » [en ligne], *The Building Conservation Directory*, 1997

< <https://www.buildingconservation.com/articles/solvent/solvent.htm> > (consulté le 2 novembre 2023)

PHENIX Alan, « The Swelling of Artists’ Paints in Organic Solvents. Part 1, A Simple method for measuring the in-plane swelling of unsupported paint films », *Journal of the American Institute for Conservation*, 2002, vol. 41, n° 1, p. 43-60

PHENIX Alan, « The Swelling of Artists’ Paints in Organic Solvents. Part 2, Comparative

swelling powers of selected organic solvents and solvent mixtures», *Journal of the American*

*Institute for Conservation*, 2002, vol. 41, n° 1, 61-90

STAVROUDIS Chris, « Gels: Evolution in Practice », in ANGELOVA Lora (ed), *Gels in the Conservation of Art,* London, Archetype Publications, 2017, p. 209-217

STAVROUDIS Chris, « More from CAPS 3: surfactants, silicone-based solvents, and microemulsions », *WAAC Newsletter*, 2012, vol. 34, n° 3, p. 24-27

< [http://cool.conservation-us.org/waac/wn/wn34/wn34-3/wn34-306.pdf >](http://cool.conservation-us.org/waac/wn/wn34/wn34-3/wn34-306.pdf%20%3E%20) (consulté le 2 novembre 2023)

STAVROUDIS Chris, « Pemulen Revised: pHuck the pH Meter », *WAAC Newsletter,* 2012, vol. 34, n°

2, p. 19

< [http://cool.conservation-us.org/waac/wn/wn34/wn34-2/wn34-206.pdf >](http://cool.conservation-us.org/waac/wn/wn34/wn34-2/wn34-206.pdf%20%3E%20) (consulté le 2 novembre 2023)

STAVROUDIS Chris, « Silicone-Based Solvents in Conservation. As free solvents and components of gel systems and microemulsions », in *Dall'olio all'acrilico, dall'impressionismo all'arte contemporane - Monographie : studi, ricerche, indagini scientifiche ed interventi conservative. Atti del VII Congresso Internazionale Colore e Conservazione, Politechnico di Milano, 13-14 November 2015*. A cura di Valentina Emanuela SELVA BONINO, CESMAR7 (Centro per lo Studio dei Materiali per il Restauro), Saonara, Il Prato, 2016, p. 176-184

STAVROUDIS Chris, « Sorting Out Surfactants » [en ligne], *WAAC Newsletter*, 2009, vol. 31, n° 1, p. 18-21

< [http://cool.conservation-us.org/waac/wn/wn31/wn31-1/wn31-105.pdf >](http://cool.conservation-us.org/waac/wn/wn31/wn31-1/wn31-105.pdf%20%3E%20) (consulté le 2 novembre 2023)

STAVROUDIS Chris, BLANK Sharon, « Solvents & Sensibility » [en ligne], *WAAC Newsletter*, May 1989, vol. 11, n° 2, p. 2-10

< <https://cool.culturalheritage.org/waac/wn/wn11/wn11-2/wn11-202.html> > (consulté le 2 novembre 2023)

STAVROUDIS Chris, DOHERTY Tiarna, « A Novel Approach to Cleaning II: Extending the modular cleaning program to solvent gels and free solvents, part 1 » , *WAAC Newsletter*, 2007, vol. 29, n° 3, p. 9-15

< <http://cool.conservation-us.org/waac/wn/wn29/wn29-3/wn29-304.pdf>> (consulté le 2 novembre 2023)

STOLOW Nathan, « Application of science to cleaning methods: solvent action studies on pigmented and unpigmented linseed oil films », in *Recent advances in conservation. Contributions to the IIC Rome conference 1961*, London, <Butterworths>, 1963, p. 84-88

STULIK Dusan C., KHANJIAN Herant, DORGE Valerie, DE TAGLE Alberto, « Scientific investigation of surface cleaning processes : quantitative study of gel residue on porous and topographically complex surfaces », in *ICOM, 13Th triennial meeting Rio de Janeiro, 22-27 September 2002*, London : James & James, 2002, p. 245-251

TORRACA Giorgio, *Solubilità e solventi. Note per restauratori* [périodique n° spécial], *Bollettino [del Centro di Studi per la Conservazione della Carta]*, 1987/1988, n° 1, 61 p.

TORRACA Giorgio, *Solubilité et solvants utilisés pour la conservation des biens culturels*, [traduit de l’anglais], Rome, ICCROM, s.d. [1990], 78 p.

TSANG Jia-Sun, ERHARDT David, « Current Research on the Effects of Solvents and Gelled and Aqueous Cleaning Systems on Oil Paint Films », *Journal of the American Institute for Conservation*, 1992, vol. 31, n° 1, p. 87-94

WOLBERS Richard C., *Notes for workshop on new methods in the cleaning of painting prepared by Richard C. Wolbers with Nanette T. Sherman and C. Stavroudis* = *Stage animé par Monsieur Richard Wolbers assisté de Madame Géraldine Guillaume-Chavannes, 17-29 juin 1991*, Paris, ARAAFU, 1991

WOLBERS Richard C., « Recent developments in the use of gel formulations for the cleaning of paintings », in *Restoration'92 - Preprints to the conference held at the RAI international exhibition and congress centre, Amsterdam, 20-22 October 1992*. Ed. TODD Victoria, London, UKIC, 1992, p. 74-75

\*WYPYCH George, *Handbook of Solvents*, Toronto: ChemTech Publishing, 2001, XXV-1675 p.

**Vidéos réalisées par le Getty Conservation Institute**

Calibrating Conventional pH Meters

< <https://www.youtube.com/watch?v=9Ktlz0uw6kw> >

Calibrating pH and Conductivity: Horiba Meters

< <https://www.youtube.com/watch?v=_nx3gNnKsUE> >

Preparing pH- and Conductivity- Adjusted Water

< <https://www.youtube.com/watch?v=hGAUAgNYZjI> >

Preparing a Pemulen Gel from MCP and Making an Emulsion

< <https://www.youtube.com/watch?v=2O5pYyc45Qo> >

Making Agarose Gel and Preparing an Agarose Plug

< <https://www.youtube.com/watch?v=SX4n2DO6Lao> >

Measuring Surface pH and Conductivity Using Water Drop and Agarose Plug Methods

< <https://www.youtube.com/watch?v=bOqZEE7Kb8Y> >

Mixing and Using Velvesil Plus

< <https://www.youtube.com/watch?v=i6cet8sa-6Y> >

Preparing a Dow Mineral Spirits Microemulsion (With Cosurfactants)

< <https://www.youtube.com/watch?v=SGkf3i7rnDw> >

Preparing a Silicone Microemulsion (With Cosurfactant) – [without cosurfactant]

< <https://www.youtube.com/watch?v=xDpwloLqJS4> >

**Autres bibliographies réalisées par la bibliothèque de l’inp**

Programme modulaire pour le nettoyage des polychromies / Modular Cleaning Program MCP : les gels de solvants

< [Programme modulaire pour le nettoyage des polychromies : méthodes aqueuses - niveau 1 | Inp - Médiathèque numérique](https://mediatheque-numerique.inp.fr/documentation-pedagogique/orientations-bibliographiques-0/programme-modulaire-pour-nettoyage-polychromies-methodes-aqueuses-niveau-1) > (consulté le 2 novembre 2023)

Notions chimiques et physico-chimiques sur le principe du nettoyage

< [Notions chimiques et physico-chimiques sur le principe du nettoyage | Inp - Médiathèque numérique](https://mediatheque-numerique.inp.fr/documentation-pedagogique/orientations-bibliographiques-0/notions-chimiques-physico-chimiques-sur-principe-nettoyage)> (consulté le 2 novembre 2023)