

## Morten Ryhl-Svendsen Publications (-2020)

### 1. Publications with peer-review

#### *1.1 Journal papers (peer reviewed)*

Smedemark, S.H., Ryhl-Svendsen, M., (2020). The contribution of formic and acetic acid from paper to indoor air pollution in archives and its dependence on temperature. *Journal of Paper Conservation* (accepted).

Grinder-Hansen, P., Kjær, U., Ryhl-Svendsen, M., Colombini, M.P., Degano, I., La Nasa, J., Sabatini, F., van der Plicht, J., Rasmussen, K.L., (2020). Textiles and environment in the showcase containing Saint Canute the Holy († AD 1086): Radiocarbon dating and chemical interactions. *Heritage Science*, 8, paper 95, 19 pp.

Smedemark, S.H., Ryhl-Svendsen, M., Toftum, J. (2020). Distribution of temperature, moisture and organic acids in storage facilities with heritage collections. *Building and Environment*, 175, 10 pp.

Smedemark, S.H., Ryhl-Svendsen, M., Schieweck, A. (2020). Quantification of formic and acetic acid emissions from heritage collections under room conditions. Part 1: laboratory and field measurements. *Heritage Science*, 8, 8 pp.

Smedemark, S.H., Ryhl-Svendsen, M., Toftum, J. (2020). Removal of organic acids in museum storage rooms by active and passive sorption techniques. *Studies in Conservation*, 65, pp. 251-261.

Padfield, T., Ryhl-Svendsen, M., Klens Larsen, P., Aasbjerg Jensen, L. (2018). A review of the physics and the building science which underpins methods of low energy storage of museum and archive collections. *Studies in Conservation*, 63-S1, pp. 209-215.

Bernath, A., Teodorescu, I., Ryhl-Svendsen, M., Badea, E., Miu, L., Guttman, M. (2018) Levels of Preservation for Cultural Heritage within an Open-air Museum. *Studies in Conservation*, 63-S1, pp. 323-325.

Bonde Andreassen, A.S., Ryhl-Svendsen, M., (2018) Partikelforurening fra levende lys i kirkerum. *Meddelelser om Konservering*, vol. 2017, pp. 19-30 [in Danish].

Skytte, L., Rasmussen, K.L., Svensmark, B., Ryhl-Svendsen, M., Brimblecombe, P. (2017). Monitoring the accumulated water soluble airborne compounds deposited on surfaces of showcases and walls in museums, archives and historical buildings. *Heritage Science*, 5, 12 pp.

Christensen, J.M., Ryhl-Svendsen, M. (2014). Household air pollution from wood burning in two reconstructed houses from the Danish Viking Age. *Indoor Air*, 25, pp. 329-340.

Skytte, L., Rasmussen, K.L., Ryhl-Svendsen, M., Svensmark, B., Brimblecombe, P. (2012). Ammonia chemistry within Danish churches. *Science of the Total Environment* 417-418, pp. 13-20.

Grøntoft, T., López-Aparicio, S., Scharff, M., Ryhl-Svendsen, M., Andrade, G., Obarzanowski, M., Thickett, D. (2012). Impact loads of air pollutants on paintings: Performance evaluation by modeling for microclimate frames. *Journal of the American Institute of Conservation* 50, pp. 105-122.

Stengaard Hansen, L., Åkerlund, M., Grøntoft, T., Ryhl-Svendsen, M., Schmidt, A.L., Berg, J.-E., Jensen, K.M.V. (2012). Future pest status of an insect pest in museums, *Attagenus smirnovi*: Distribution and consumption in relation to climate change. *Journal of Cultural Heritage* 13, pp. 22-27.

Bøhm, B., Ryhl-Svendsen, M. (2011). Analysis of the thermal conditions in an unheated museum store in a temperate climate. On the thermal interaction of earth and store. *Energy and Buildings* 43, pp. 3337-3342.

Ryhl-Svendsen, M., Clausen, G., Chowdhury, Z., Smith, K.R. (2010). Fine particles and carbon monoxide from wood burning in 17th-19th century Danish kitchens: measurements at two reconstructed farm houses at the Lejre Historical-Archaeological Experimental Center. *Atmospheric Environment* 44, pp. 735-744.

López-Aparicio, S., Grøntoft, T., Odlyha, M., Dahlin, E., Mottner, P., Thickett, D., Ryhl-Svendsen, M., Schmidbauer, N., Scharff, M. (2010). Measurement of organic and inorganic pollutants in microclimate frames for paintings. *e-Preservation Science* 7, pp. 59-70.

Grøntoft, T., Odlyha, M., Mottner, P., Dahlin, E., Lopez-Aparicio, S., Jakiela, S., Scharff, M., Andrade, G., Obarzanowski, M., Ryhl-Svendsen, M., Thickett, D., Hackney, S., Wadum, J. (2010). Pollution monitoring by dosimetry and passive diffusion sampling for evaluation of environmental conditions for paintings in microclimate frames. *Journal of Cultural Heritage* 11, pp. 411-419.

Ryhl-Svendsen, M., Clausen, G. (2009). The effect of ventilation, filtration and passive sorption on indoor air quality in museum storage rooms. *Studies in Conservation* 54, pp. 35-48.

Ryhl-Svendsen, M. (2008). Corrosivity measurements of indoor museum environments using lead coupons as dosimeters. *Journal of Cultural Heritage* 9, pp. 285-293.

Ryhl-Svendsen, M. (2006), Indoor air pollution in museums: a review of prediction models and control strategies, *Reviews in Conservation* 7, pp. 27-41.

Ryhl-Svendsen, M. (2005) A review of indoor and outdoor air pollution in relation to museums, *Meddelelser om Konservering* 1, pp. 18-27.

Ryhl-Svendsen, Glastrup, J., (2002) Acetic acid and formic acid concentrations in the museum environment measured by SPME-GC/MS, *Atmospheric Environment* 36, pp. 3909-3916.

## 1.2 Conference contributions (peer reviewed)

Smedemark, S.H., Ryhl-Svendsen, M., Toftum, J. (2021). Comparing the air quality performance in unoccupied storage buildings with mechanical ventilation and semi-passive climate control. Proceedings from the 19th International Council of Museums - Committee for Conservation (ICOM-CC) Triennial Conference, 2021, Beijing, China (accepted).

Klenz Larsen, P., Ryhl-Svendsen, M., (2019). Low energy museum storage. *The Mechanics of Art Materials and Its Future in Heritage Science. Smithsonian Contributions to Museum Conservation, Nr. 10*, Smithsonian Institution Scholarly Press, Washington DC, pp. 57-64.

Smedemark, S.H., Ryhl-Svendsen, M., Schieweck, A. (2018). The effect of temperature on emissions of carboxylic acids in passive climate controlled repositories with cultural heritage collections. *Proceedings from the 15th Conference of the International Society of Indoor Air Quality & Climate (Indoor Air 2018)*, 22-27 July 2018, Philadelphia, USA.

Klenz Larsen, P., Aasbjerg Jensen, L., Ryhl-Svendsen, M., Padfield, T. (2017). The microclimate within a Neolithic passage grave. *ICOM-CC 18th Triennial Conference Preprints: Copenhagen, 4–8 September 2017*. Paris: ICOM-CC, International Committee of Museums, pp. 1-9.

Borring, N., Buti, D., Vinther Hansen, B., Nielsen, J. M., Ryhl-Svendsen, M., Swane, A., Vila, A. (2017). The past, present and future of lead white in Denmark's national graphic art collections. *ICOM-CC 18th Triennial Conference Preprints: Copenhagen, 4–8 September 2017*. Paris: ICOM-CC, International Committee of Museums, 9 pp.

Vila, A., Ryhl-Svendsen, M., Buti, D., Nielsen, J.M., Hansen, B.V., Borring, N., Swane, A. (2016). Does the lead white on graphic art have a dark future? *CHEMCH2016, 4th International Congress, Chemistry for Cultural Heritage*, Brussels: 6-8 July 2016, (poster).

Ryhl-Svendsen, M., Jensen, L. Aa., Larsen, P.K. (2014). The air quality in low-ventilated museum storage buildings. *ICOM Committee for Conservation 17th Triennial Conference*. Melbourne, 15-19 September 2014 (paper no. 1512), 8 pp.

Ryhl-Svendsen, M., Jensen, L.Aa., Larsen, P.K., Bøhm, B., Padfield, T. (2013). A museum building controlled by solar energy. *Climate for Collections: Standards and Uncertainties*, 7-9 November 2012, Doerner Institute, Munich, pp. 141-148.

Ryhl-Svendsen, M., Larsen, P.K., Jensen, L.Aa. (2012). Ultra-low energy buildings for storage in museums and archives. *Healthy Buildings 2012, 10th International Conference*. Brisbane, 8-12 July 2012, 6 pp. (paper 7G.2).

Ryhl-Svendsen, M. (2011). The influence of urban air pollution in archives. *ICOM Committee for Conservation 16th Triennial Conference*, Lisbon, 19-23 September 2011, 7 pp.

Ryhl-Svendsen, M., Jensen, L.Aa., Larsen, P.K., Bøhm, B., Padfield, T. (2011). Ultra-low-energy museum storage. *ICOM Committee for Conservation 16th Triennial Conference*, Lisbon, 19-23 September 2011, 8 pp.

Ryhl-Svendsen, M. (2011). Passive sorption of organic compounds on clay bricks. *INDOOR AIR 2011, The 12th International Conference on Indoor Air Quality and Climate*, Austin TX, 5-11 June 2011, 6 pp. (paper 383).

Ryhl-Svendsen, M., Rasmussen, K.L., Glastrup, J., Skytte, L. (2011). The Showcase containing the remains of the Danish King St. Knud the Holy (+AD1086). *INDOOR AIR 2011, The 12th International Conference on Indoor Air Quality and Climate*, Austin TX, 5-11 June 2011, 2 pp. (paper 380).

Ryhl-Svendsen, M., Jensen, L.Aa., Larsen, P.K., Padfield, T. (2010). Does a standard temperature need to be constant? (Conference paper from 'Going Green', London 2009). Published in: *Meddelelser om Konservering* 1/2010, pp. 13-20.

Ryhl-Svendsen, M., Grinde, L., Christoffersen, L.D. (2008). The microclimate inside archival boxes in rooms with fluctuating relative humidity and temperature. *ICOM Committee for Conservation 15th Triennial Meeting*, New Delhi, 22-25 September 2008, p. 821/poster.

Padfield, T., Larsen, P.K., Jensen, L.A., Ryhl-Svendsen, M. (2007). The potential and limits for passive air conditioning of museums, stores and archives. *Museum Microclimates, Contributions to the Copenhagen Conference 19-23 November 2007*, Nationalmuseet, Copenhagen, pp. 191-198.

Ryhl-Svendsen, M. (2007). The role of air exchange rate and surface reaction rates on the air quality in museum storage buildings. *Museum Microclimates, Contributions to the Copenhagen Conference 19-23 November 2007*, Nationalmuseet, Copenhagen, pp. 221-226.

Odlyha, M., Theodorakopoulos, C., Thickett, D., Ryhl-Svendsen, M., Slater, J.S. Campana, R. (2007). Dosimeters for indoor microclimate monitoring for cultural heritage. *Museum Microclimates, Contributions to the Copenhagen Conference 19-23 November 2007*, Nationalmuseet, Copenhagen, pp. 73-79.

Odlyha, M., Wade, N., Wang, Q., Campana, R., Slater, J.M., Ryhl-Svendsen, M., Padfield, T., De Santis, F., Smith, V.A., Bullock, L., Ferreira, E.S.B., Boon, J.J., Pratt, K., Ormsby, B., (2005). Microclimate indoor monitoring: damage assessment for cultural heritage preservation. *ICOM Committee for Conservation, 14th Triennial Meeting, The Hague, 12-16 September 2005*, pp. 670676.

Ryhl-Svendsen, M., Glastrup, J., (2003). SPME-GC/MS analysis of organic acids in indoor museum environments. *Healthy Buildings 2003*, Singapore 7-11 December 2003 (Vol. 1), ISIAQ, pp. 193-197.

Ryhl-Svendsen, M., Padfield, T., Smith, V., De Santis, F., (2003). The indoor climate in historic buildings without mechanical ventilation. *Healthy Buildings 2003*, Singapore 7-11 December 2003 (Vol. 2), ISIAQ, pp. 278-283

Ryhl-Svendsen, M. (2003). Indoor air pollution in museum display cases. *Healthy Buildings 2003*, Singapore 7-11 December 2003 (Vol. 1), ISIAQ, pp. 189-192.

### ***1.3 Contributions to books (peer-reviewed)***

Ryhl-Svendsen, M. (2019). Organic Acids in Confined Storage Areas. *Preventive Conservation: Collection Storage*. Society for the Preservation of Natural History Collections (SPNHC), New York, pp. 432-433.

## **2. Other publications**

### ***2.1 Journal paper: popular / non-peer review***

Ryhl-Svendsen, M. (2017). Air Pollution in Museum Buildings. *Brukenthal Acta Musei*, XII, No. 4, pp. 617-626.

Padfield, T., Ryhl-Svendsen, M., Larsen, P.K., Jacobsen, M., Jensen, L. Aa., (2015). Climate Control of the Arnamagæan Archive. *IAMFA Papyrus* 15(3), pp. 33-36.

Larsen, P.K., Ryhl-Svendsen, M., Jensen, L.Aa., Bøhm, B., Padfield, T. (2012): Konstantes Raumklima und niedriger – kein Widerspruch. Zehn Jahre Erfahrung mit energieeffizienter Klimatisierung in Archiven und Museumsmagazinen. *RESTAURO* 7/2012, pp. 53-60 [in German].

Ryhl-Svendsen, M. (2012). Ophedet debat eller tørre argumenter? - den nye diskussion af museers klimakrav. *Danske Museer* 25(3), pp. 27-30 [in Danish].

Alling, A., Ryhl-Svendsen, M. (2012). Hvad er indeklimaet i en flyttekasse? *Meddelelser om Konservering* 1/2012, pp. 31-33 [in Danish].

Larsen, P.K., Ryhl-Svendsen, M., Jensen, L.Aa., Bøhm Benny (2011). Museumsmagasiner med lavt energiforbrug. *HVAC Magasinet* 4/2011, pp.76-81 [in Danish].

Larsen, P.K., Jensen, L.Aa., Ryhl-Svendsen, M., Padfield, T. (2009). Museumsbygninger med lavt energiforbrug. *Nationalmuseets Arbejdsmark* 2009, pp. 121-136 [in Danish].

Ryhl-Svendsen, M. (2008). Ozone detection using natural rubber dosimeters: Quantitative measurements using light microscopy and attenuated total reflectance spectroscopy. *Zeitschrift für Kunsttechnologie und Konservierung* 21(2), pp. 240-249.

Ryhl-Svendsen, M. (2004). Indeklima i historiske bygninger. *HVAC Magasinet* 4-2004, pp. 28-31 [in Danish].

Ryhl-Svendsen, M., Padfield, T. (2003). Præventiv konservering, at forebygge er bedre end at helbrede. *Nationalmuseets Arbejdsmark*, pp. 101-117 [in Danish].

Ryhl-Svendsen, M. (2001). Luftschadestoffe in Museen, Eine Einführung in Wirkungsweise, Monitoring und Kontrolle. *RESTAURO* 8/2001, pp. 613-619 [in German].

Ryhl-Svendsen, M. (1999). Også kulturen kan få åndenød, *Danvak Årskrift*, 3 pp [in Danish].

## 2.2 Conference papers and published abstracts (without peer review)

- Padfield, T., Ryhl-Svendsen, M., Klenz Larsen, P., Mette, J., Aasbjerg Jensen, L. (2018). The climate control of the Arnamagnæan Archive. *Care and conservation of manuscripts 16: Proceedings of the sixteenth international seminar held at the University of Copenhagen 13th-15th April 2016*. Museum Tusulanum, pp. 35-46.
- Klenz Larsen, P., Padfield, T., Ryhl-Svendsen, M. & Aasbjerg Jensen, L. (2017). Drifting temperature climate control for archives and stores. *Les nouvelles rencontres de la conservation preventive*. Paris: APrévU D'ÉDITER, pp. 107-113.
- Smedemark, S.H., Ryhl-Svendsen, M., Hansen, B.V., Nielsen, I. (2014). Temperature dependent emission of formic and acetic acid from paper, and its consequences for the air quality in archives. *11th International Conference Indoor Air Quality in Heritage and Historic Environments (IAQ 2014)*. Prague April 13-16, 2014. Poster.
- Christensen, J.M., Ryhl-Svendsen, M., (2013). Living conditions and indoor air quality in a reconstructed Viking house. *7<sup>th</sup> Experimental Archaeology Conference*, St. Fagans National History Museum & Cardiff University, Cardiff, 11-12 February 2013. Poster.
- Ryhl-Svendsen, M. (2012) Acetic acid in air: a review. *IAQ2012. Indoor Air Quality in Heritage and Historic Environments, Book of Abstracts*. UCL, London, 17-20 June 2012, p. 16.
- Ryhl-Svendsen, M., Scharff, M., Grøntoft, T., Dahlin, E., Lopez-Aparicio, S., Odlyha, M., Andrade, G., Ortega, A., Obarzanowski, M., Czop, J., Hackney, S., Thicket, D., Colombini, M.P., Bonaduce, I. (2011): Gaseous pollutants inside microclimate frames: results from the Propaint project. *Facing the Challenges of Panel Paintings Conservation: Trends, Treatments and Training. Proceedings: May 17-18, 2009*. Getty Conservation Institute, Los Angeles, pp. 165-177.
- Stengaard Hansen, L., Åkerlund, M., Grøntoft, T., Ryhl-Svendsen, M., Schmidt, A.L., Berg, J.-E., Jensen, K.M.V. (2011). The brown carpet Beetle, *Attagenus smirnovi*: how will climate change affect its future status. *Integrated Pest Management for Collections: Proceedings of "2011: a Pest Odyssey", 10 years Later*. English Heritage, Swindon, pp. 55-60.
- Ryhl-Svendsen, M. (2010). The micro-environment inside archival boxes, part 2: Air pollution. *Impact of the Indoor Environment on the Preservation of our Movable Heritage (COST Action D42 EnviArt Final Conference)*, Trinity College, Dublin, 7-10 November 2010, pp. 25-26.
- Ryhl-Svendsen, M. (2010). The generation of indoor air pollution from surface reactions. *IAQ2010: 9<sup>th</sup> Indoor Air Quality Meeting*, Chalon-sur-Saône, 21-23 April 2010, p. 89.
- Ryhl-Svendsen, M. (2009). Use of steady-state mass balances for modeling cultural heritage environments. *EAS 2009 Abstracts, Eastern Analytical Symposium*, Somerset NJ, p. 25.
- Ryhl-Svendsen, M. (2008). An investigation of the air quality in the archive at the Arnamagnæan Collection in Copenhagen. *Care and Conservation of Manuscripts: Proceedings of the tenth international seminar held at the University of Copenhagen 19-20 October 2006*, Museum Tusculanum Press, Copenhagen, pp. 198-206.

Grøntoft, T., Lopez-Aparicio, S., Dahlin, E., Odlyha, M., Jakiela, S., Mottner, P., Scharff, M., Ryhl-Svendsen, M., Andrade, G., Obarzanowski, M., Colombini, M.P., Bonaduce, I., Hackney, S., Wadum, J., Thickett, D. (2008): EU Project PROPAIN: Assessment of environmental protection for paintings offered by microclimate frames and varnishes. *8th European Conference on Research for Protection, Conservation and Enhancement of Cultural Heritage: Cultural Heritage Research Meets Practice*, 10-14 November 2008, University of Ljubljana, pp. 12-16.

Ryhl-Svendsen, M. (2005), Luftforurening i museer, arkiver og biblioteker. *Magasinbygningens fysik og funktion: Postprint*, Museumshøjskolen, Sorø, Danmark, 18-22 oktober 2004, Nordisk Konservatorforbund, pp. 45-49 [in Danish].

Jacobsen, M-L., Ryhl-Svendsen, M., (2004). A Dust Atlas. *Sixth Indoor Air Quality Meeting (IAQ2004)*, Padova, 10-12 November 2004 (poster).

### **2.3 Published scientific reports**

Ryhl-Svendsen, M., Jensen, L.Aa., Bøhm, B., Larsen, P.K. (2012). *Low-energy Museum Storage Buildings: Climate, Energy Consumption, and Air Quality. UMTS Research Project 2007-2011: Final Data Report*. Dept. of Conservation, National Museum of Denmark, Kgs. Lyngby, 122 pp.

Dahlin, E. (ed.), Grøntoft, T., López-Aparicio, S., Odlyha, M., Scharff, M., Larsen, T., Andrade, G., García, A.T., Ortega, A., Mottner, P., Obarzanowski, M., Czop, J., Kozłowski, R., Colombini, M. P., Bonaduce, I., Thickett, D., Hackney, S., Wadum, J., Haack Christensen, A., Ryhl-Svendsen, M., Jakiela, S. (2010). *PROPAIN, Improved Protection of Paintings during Exhibition, Storage and Transit: Final Activity Report*. Norwegian Institute for Air Research (NILU), Kjeller, 164 pp

### **2.4 Dissertations**

Ryhl-Svendsen, M., *Air quality in museum storage buildings*. PhD thesis: School of Conservation, Royal Danish Academy of Fine Arts (2007).

Ryhl-Svendsen, M., *Indoor air pollution in museums - detection of formic and acetic acid emissions from construction materials by SPME-GC/MS*. Master thesis: School of Conservation, Royal Danish Academy of Fine Arts (2001)

### **2.5 Encyclopedia**

Seven contributions to *Danmarks Nationalleksikon: Den Store Danske Encyklopædi [Great Danish Encyclopedia]*; articles on historic art/photography (1998-2000) [in Danish].

### **2.6 Misc.**

Scharff, M., Shashoua, Y., Ryhl-Svendsen, M. (2020). Obituary: Tim Padfield (1937-2020). *News in Conservation*, 78, pp. 32-33.