

# Towardless

## Plant-based Electrical and Art Energy

*A selection of solar cells and research material that originate from art\_craft, art\_science, scientific investigations and the questioning of light, energy, bodies, and matter. Seven solar cells are shown as photoprints, with photography by Anne Kinnunen (Aalto ARTS).*

V2 gallery, Väre, Aalto University, Otaniementie 14, Espoo, Finland - 8 till 29 September, 2021

## HANDOUT

### Left wall



1 – No title  
Photo print on Dibond (100 x 73 cm)  
Dimension: 10.5 x 10.5 cm

Photo by Anne Kinnunen (2021).

Backlit demonstration solar cells, Janne Halme. Cell with TKK university logo; cell where electrolyte has slowly dried during storage forming crystal of unknown composition (ca. 2003-2005). For solar cell materials, see: 10 – Solar cells from the research archive of Janne Halme (2001-).



2 – No title  
Photo print on Dibond (100 x 73 cm)  
Dimension: 10 x 12 cm

Photo by Anne Kinnunen (2021).

Backlit research solar modules, Sannamari Pilpola (2015). Red dye (N719), blue dye (SQ2), NIR dye (Silicon 2,3-naphthalocyanine dichloride), yellow electrolyte. Dye degradation, electrolyte leakage. Other materials, see: 10 – Solar cells from the research archive of Janne Halme (2001-).



3 – No title  
Photo print on Dibond (50 x 50 cm)  
Dimension: 4 x 2 cm; 2 x 2 cm

Photo by Anne Kinnunen (2021).

Experimental dye sensitized solar cells, Bartaku and Christian Thornton (2013). Bore silicate glass, tin oxide, titanium dioxide, pomegranate sap, iodine, copper wire.



4 – No title  
Photo print on Dibond (50 x 50 cm)  
Dimension: 3 x 2 cm

Photo by Anne Kinnunen (2021).

Experimental dye sensitized solar cells, Bartaku and Christian Thornton (2013). Bore silicate glass, tin oxide, titanium dioxide, pomegranate sap, iodine, copper wire.

## Vitrine



5 – Pile of e-waste, temporarily self-lit by its left-over solar energy

*Various materials; raw-material distribution representative of dye-sensitized solar cell energy technology.*

Photo by Janne Halme (2021).

Dye-sensitized solar cells, discarded after use for scientific research. Various authors (Kati Miettunen, Ghufuran Hashmi, et al.), New Energy Technologies group, Aalto University.

## Back wall



6 – Blick Vlt

*Solar glass cells: Aronia m. colorants, glass, fluorine-doped tin oxide, titanium dioxide, iodine, lithium iodide, 3-methoxypropionitrile, platinum, thermoplastic polymer, silver, aluminum; plywood*

Dimension: 40 x 30 cm

Photo by Anne Kinnunen (2021).

*Blick Vlt* is a hand-painted solar panel based upon a painting by JMW Turner. The colorants in the glass solar cells originate from leaves, fruits and stems from the *Aronia m.* plant. They are the main resource for the transforming of light into electrical energy.

## Right wall



7 – No title  
Photo print on Dibond (73 x 100 cm)  
Dimension: 4 x 2 cm

Photo by Anne Kinnunen (2021).

Experimental dye sensitized solar cell bottom plate (back-electrode), Bartaku and Christian Thornton (2011, 2012). Glass, silver, tin oxide, unidentified metal.



8 – No title  
Photoprint on Dibond (73 x 100 cm)  
Dimension: 4 x 2 cm

Photo by Anne Kinnunen (2021).

Experimental dye sensitized solar cell bottom plate (back-electrode), Bartaku and Christian Thornton (2011, 2012). Glass, silver, tin oxide, unidentified metal.

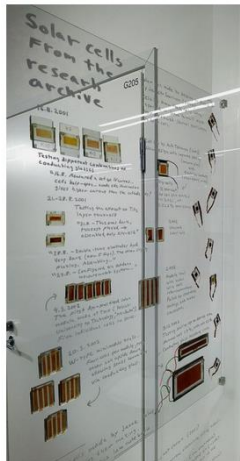


9 – No title  
Photoprint on Dibond (100 x 73 cm)  
Dimension: 2 x 4 cm

Photo by Anne Kinnunen (2021).

Experimental dye sensitized solar cell bottom plate (back-electrode), Bartaku and Christian Thornton (2011, 2012). Glass, silver, tin oxide, copper wire, unidentified metal.

## Window



10 – Solar cells from the research archive of Janne Halme (2001-)  
Photoprint on Dibond (100 x 73 cm)  
Dimension: from 1.7 x 2.5 cm to 10 x 5.5 cm

Dye-sensitized solar cells of various sizes from the research archive of Janne Halme, Department of Applied Physics, Aalto University. Cells made by J.H. unless author mentioned. Quotes from the lab notebook of J.H. (translation).

*Glass, fluorine-doped tin oxide, indium tin oxide, titanium dioxide, red dyes (N3, N719), blue dye (SQ2), NIR dye (Silicon 2,3-naphthalocyanine dichloride), platinum, graphite, carbon black, antimony-doped tin oxide, iodine electrolyte (iodine, potassium iodide, organic solvents, and additives), polymer sealant, glue, Cu and Al tape, silver paint and epoxy, electric wire.*

## Door



11 – Blick Vlt (making detail)  
Video  
Duration: 3:02 min (loop)

Video production: Nina Pulkkis, Fotoni film (2020). Photo from the screen by Anne Kinnunen (2020).

Video with a selection of parts of the making of Blick Vlt.

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## Exhibition website

[www.aalto.fi/en/events/towardless-plant-based-electrical-and-art-energy](http://www.aalto.fi/en/events/towardless-plant-based-electrical-and-art-energy)

## Online related works

### 1 - **Blck Vlt** – making of documentary (15 min)

Nina Pulkkis (Fotoni) documented the process of making Blck Vlt and interviewed the makers.

<https://youtu.be/r6PZ-1iJpAY>

### 2 - **Painting Energies** Podcast

Hosts Bartaku and Janne Halme explore Blck Vlt's making-of observations in conversation with guests.

Website: <https://www.aalto.fi/en/podcasts/painting-energies-podcast>

Listen via: <https://soundcloud.com/painting-energies-podcast>

First episode released on September 10, 2021

### 3 - **Baroa belaobara: berryapple**

Background information about the research processes can be found in Bartaku's recently published monograph. Limited edition for sale via Aalto ARTS bookshop

<https://shop.aalto.fi/p/1558-baroa-belaobara-berryapple>

or free downloadable as PDF:

<https://aaltodoc.aalto.fi/handle/123456789/107574>

## Credits

### Concept & realisation

Janne Halme and Bartaku

### Blck Vlt process and production

Research group Aamo (Aronia art morphing) based upon an idea by *Bartaku Baroa. b.* Aamo members: Janne Halme & Pyry Mäkinen (Aalto PHYS), Paulo Pinho (Aalto ELEC), Merja Penttilä (Aalto CHEM, VTT), Bartaku (Aalto ARTS).

### Solar e-waste

New Energy Technologies Group, Aalto PHYS, various authors (Kati Miettunen, Ghufra Hashmi, et al.);

### Janne Halme archives

Selected solar cell and modules made in New Energy Technologies group, Aalto University, by J.H. and his collaborators Antti Tolvanen, Jaakko Saarinen, and Sannamari Pilpola.

### Bartaku archives

Selected cells all co-creation with Christian Thornton, Xaquixe Glass Innovation Studio (Oaxaca, Mex.).

**Photography:** Anne Kinnunen, Aalto ARTS

**Technical partners:** Biofilia (Lab for Biological Arts) and Biogarage (Aalto University)

**Photo printing:** Aalto Photography Workshop

**Financial support:** Aalto Materials Platform, Aalto Online Learning, and the Diversity and Inclusivity Fund of the School of Science.

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