PRINZ OPTICS INFOLETTER

>spectrum<

Edition 1 / 2021

Inspiration, commitment and skill

These are the driving forces that set the creative process in motion not just in the world of design – they also advance progress in the field of technological development.

Just as our fascinating colour effect glass, coated with the possibilities of nanotechnology, inspires visual artists and architects, it is their desires and requirements that in turn inspire us in our development work. But the industry also expects innovative problem solving from us, thereby challenging our commitment and “coating skill”.

In the meantime, we have developed new technologies that dynamically expand our spectrum of possibilities: special coatings that change the material properties of glass, metals and plastics.

In our › spectrum ‹ newsletter, we share some insights into our work, product range and projects, and we would be delighted to discuss them with you.

Peter Röhlen,
Managing Director
Prinz Optics GmbH

Sorting with light

SEEING MORE THAN IS POSSIBLE WITH THE EYE ALONE

By Dr Karsten Wermbter

We have a saying in German: “The bright sun brings it to light”. With reference to the physical possibilities of the human eye, this pearl of wisdom applies only to a limited extent. Beyond the wavelength range of the primary colours red, green and blue, much remains hidden to the eye – even when the object is “seen in the light”: when detecting contamination in foodstuffs, looking for foreign matter or identifying materials and their composition, for instance.

Until now, those who wanted to gain a reliable picture of reality had conventional image processing systems at their disposal. These systems examined the quality and specific characteristics of the inspection objects on the basis of parameters such as size, shape and colour.

However, for those who want to see objects “in the right light” with greater accuracy, there are now the possibilities of hyperspectral image processing. These spectral recording systems have up to 250 recording channels that span the wavelengths in the ultraviolet range through to long-wave infrared. This makes it possible to capture the reflection properties of materials in a range of 0.2 to 5 micrometres and to thus identify materials with local precision. They can also be used to determine differences in the chemical composition of the inspection objects. Organic and inorganic materials can be detected which cannot be distinguished with conventional methods. This is a technology with applications in fields such as plastic recycling and quality assurance in the food industry.

The “right light” for hyperspectral imaging is generated by hyperspectral line lights. Their illumination combines many different wavelengths to create a homogeneous broadband spectrum. Instead of using only visible light, a large number of other wavelengths – including some beyond the visible spectrum – can be used to acquire information.

When it came to developing a flawless hyperspectral imaging system, there was one final optical hurdle to overcome: the protective glasses used in front of the illumination and the line scan camera must allow for optimal transmission of the wavelengths used and therefore require an anti-reflection coating developed specifically for this purpose. A standard anti-reflection coating, such as that produced by PRINZ OPTICS for diverse industrial applications, was out of the question. A special broadband anti- reflection coating that completely met the specific requirements of the system was developed.

To do so, PRINZ OPTICS in Stromberg collaborated closely with the hyperspectral line lights manufacturer MTD GmbH, based in Uffing am Staffelsee. One of our company’s core areas of expertise is changing or optimising material properties and functions with ultra- thin layers that measure just a few nanometres thick and are firmly bonded to the substrate. This is something we have been doing in particular with glass for more than 25 years in order to filter or reflect specific wavelengths, for example.

The applications of nanotechnology open up a multitude of possibilities for developing methods for manufacturing innovative products. Our expertise in this field, together with our highly efficient in-house laboratory, is at the disposal of interested companies and organisations. We have the expert knowledge needed to adapt coatings to specific requirements and to develop them in collaboration with our customers.

Here you can find out more about our advisory services: Realisation consultation service

Please see our range of optical filters for technical applications here: Technical filters

Our dichroic colour effect glass

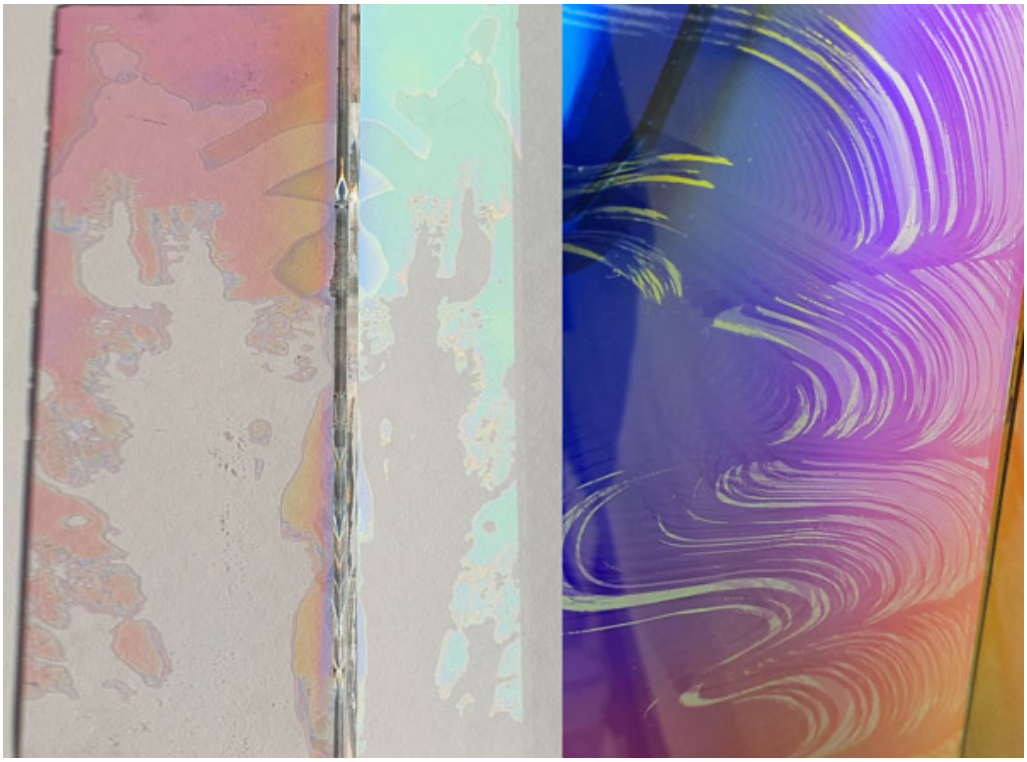
A “miracle glass” that gets its iridescent colours – comparable to a diamond – simply from light. Depending on the angle of incidence of the light rays and the viewer’s perspective, it may appear simultaneously colourless and intensely colourful, translucent and reflective. These properties are created by an extremely thin, optically transparent coating which reflects certain wavelengths of light rays whilst others are transmitted unimpeded.

For over 25 years, the beauty of these light colours has inspired architects and designers when they are creating façades and interiors. Increasingly, it is visual artists who are crafting unique glass imagery and sculptures with the radiance of this special glass.

It is our honour to present two of these artists to you by way of example: Michèle Janata and Fabian Gatermann.

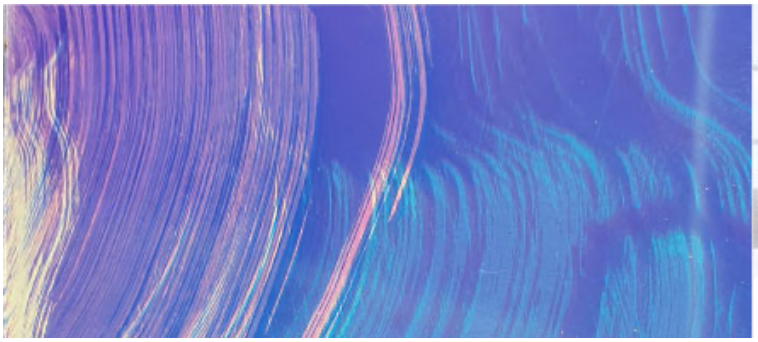
MICHÈLE JANATA

A German Columbian born in the USA and raised in Germany, Michèle Janata is currently working primarily with “light painting”, as she puts it herself. This involves her etching spontaneous drawings into dichroic glass that she has previously coated with acid-resistant asphalt varnish. The coloured light that is reflected and transmitted after the etching creates striking, new colour images. To allow these images to be experienced in free-standing form in space, she is currently developing suitable installations, including an “architectural art” project for the new Missoni Baia tower in Miami.



Her artistic intention is to “produce a concise form and an imperfect surface coupled with an element that perplexes the viewer”. The young artist seeks to use “reflections, repetitions and waves of light to create an atmospheric intensity – so as to make the invisible visible and the unimaginable conceivable”.

Michèle Janata is studying sculpture at the State Academy of Fine Arts Karlsruhe. Prior to this, she completed her BFA in Glass at the Institute of Ceramic and Glass Arts in Höhr-Grenzhausen. Her works are already represented in the State Art Collection of Rhineland-Palatinate and the Glass Museum in Coesfeld.



Michèle Janata

www.michelejanata.com

FABIAN GATERMANN

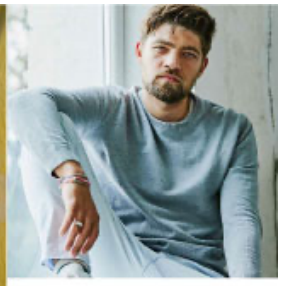
It is with his enquiring mind that the artist investigates the hidden essential characteristics of his design materials. Precise and structured in his approach, he makes the invisible visible for the viewer in his works.

When he is working with light as a material – something to which he is currently devoting himself – he is also interested in the apparent contradictions in its “essence” Dichroic colour effect glass serves as the foundation for his explorations. By working this special glass with a hand-held sandblaster, he makes the tension between the invisible and the visible in light tangible. The lines on the glass are developed from the data from a photon experiment led by Fabrizio Carbone.

His team of researchers at the Swiss Federal Institute of Technology in Lausanne (EPFL) succeeded for the first time in measuring light behaving simultaneously as a wave and a particle. Gatermann is working with the results and data from this experiment, accentuating a striking contrast between mattness and sheen as well as the difference between colour effect and non- effect. The artist succeeds in revealing the richness of the different facets of light and the diversity of its effects in a fascinating way.

Fabian Gatermann was born in Munich in 1984. He has lived and worked as a freelance artist in Munich since 2011. He gained his BA in Communication from the University of Vienna and studied media art at the University of Applied

Arts Vienna for one year and design, economics and engineering at master's level at the universities of Cologne and Curitiba. After graduating, he decided to go his own way as a freelance artist.



Fabian Gatermann

www.fabiangatermann.com

Would you like to learn more about the fascinating effects and possible uses of colour effect glass? Here you can see the effects animated: Prinz Optics Colour effect glass

Prinz Optics GmbH

Prinz Optics GmbH specialises in ultra-thin material coatings. We use them to produce technical filters for diverse applications in industry, science and medical technology; lighting filters for lighting designers and lighting technicians; conversion filters for merchandise displays for shop fitters and lighting companies, and dichroic filter glasses for architects, designers and artists.

We owe the constantly increasing quality of our consultancy work and services to our close collaboration with our customers. As a result, we are able to accommodate even specialist requirements from the industrial sector and custom requests thanks to our expertise.

Peter Röhlen, physicist

Peter Röhlen has been the managing director of PRINZ OPTICS GmbH for 25 years and its main shareholder since 2008. He has also served as the managing director of Glas-Plus Beschichtungs GmbH & Co.KG since 2010.

As an expert in coatings for glass surfaces using the sol-gel process, he focuses on the development of optical and technical interference filters.
He is also on hand to advise his customers on optical filters at any time.

Dr Karsten Wermbter, mineralogist

Dr Karsten Wermbter is the director of the Development Department at PRINZ OPTICS GmbH. He primarily focuses on optimising and expanding the company's range of product-specific coatings and the associated processes.

After previously working for SCHOTT AG, he has now been with the company for 15 years. He has extensive experience in the fields of sol-gel chemistry, nanoparticle synthesis and dip coating processes and in the application of hard coatings to glass substrates using PVD.

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