

Re: Köhler illumination question...

Source: <http://sci.tech-archive.net/Archive/sci.techniques.microscopy/2005-05/msg00014.html>

- *From:* "GTO" <gregor_o@xxxxxxxxxxxxxxxx>
 - *Date:* Mon, 02 May 2005 05:42:05 GMT
-

Hello, Aaron:

Thanks for the more detailed explanation. I first thought that the "uncolored glass" filter you mentioned was actually just a regular filter and not something that appears to the eye like the one depicted in etched.jpg. – Quite remarkable microscopic difference at 60x magnification, I must say.

The Wild M420 is a truly magnificent photomicroscope. I remember when you purchased this one. BTW, is it now known as a Leica M420?

Gregor

"Aaron" <nghy@xxxxxxxx> wrote in message
news:v74b71pbhdca47j00sgk0cgmnlkfo9oev@xxxxxxxx

> Hi Gregor,

>

> Both "etched.jpg" and "other.jpg" were recorded with a Nikon Coolpix
> 5000 mounted on a Leica M420 with a 2X supplemental objective. I used
> oblique incident illumination from a single fiber optic cable. The
> nominal magnification at the camera is about 60X. but that is not
> valid once it is displayed on a computer screen.

>

> The point is that both of these "filters" appear similar to the eye;
> what we describe as "frosted filters". I agree that the surface of
> the "fliter" ought to have bearing on the character of the lighting.

>

> Etched.jpg is the image of the element just in front of the halogen
> lamp in the Zeiss 100W lamphouse. This is the element that is swung
> into place after the procedure for Kohler illumination is performed.

>

> Other.jpg is an image of a 32mm filter that might be placed in the
> well over the field diaphragm or in a filter tray below the condenser
> on a Zeiss Standard series microscope.

>

> I have since located some ground surface filters and a sandblasted
> glass slide. These are different still. I will try to collect some
> more examples. I have much more sophisticated equipment to examing
> the surfaces. If this becomes a matter of greater curiosity I may

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> image these and post them.
>
> Aaron
>
> On Mon, 02 May 2005 01:23:54 GMT, "GTO" <gregor_o@xxxxxxxxxxxxxxxx>
> wrote:
>
>>Hello, Aaron:
>>
>>Thanks a lot for these images. This is really interesting stuff!
>>
>>Your image from an uncolored glass filter reminds me of investigations of
>>amorphous materials with AFM (such as amorphous metals). The features on
>>this glass filter might be so small that their impact is negligible for
>>light microscopy applications.
>>
>>However these structures of approx 0.01–0.05 mm in diameter on the element
>>in your 100W Zeiss lamp most certainly impact the light that passes
>>through
>>them. What is the technique you used to obtain this very informative
>>image?
>>
>>Great work! I think that we just started to find an interesting aspect,
>>which is very important for the implementation of a well working
>>illumination.
>>
>>We most certainly should more clearly define "frosted" vs. "edged" vs.
>>other
>>surface treatments that might appear like "frosted".
>>
>>What would be interesting to see, is an image of a frosted glass.
>>
>>Thanks,
>>
>>Gregor
>>
>>
>>"Aaron" <ngby@xxxxxxxx> wrote in message
>>news:qlna71p6ema6tb9cg2poa5c0345q7hp0qc@xxxxxxxx
>>> Hi Gregor,
>>>
>>> It sure looks like it. I just posted a response to Klaus which I will
>>> tag on here so you don't have to hunt for it.
>>>
>>> Hello Klaus and friends,
>>>
>>> The minute I read your post, I could not wait to see the "frosted
>>> element" under magnification.. Indeed I found things as you said.
>>> I started to look at other Zeiss filters. They are not what might be
>>> expected either. We need to review and define the terms "diffuser"
>>> and "frosted element".

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>>>>
>>> The "element" in the Zeiss 100W lamp house has the little lenses
>>> etched into the surface. These are approx 0.01–0.05 mm in diameter
>>>
>>> <http://home.comcast.net/~nghy/mywebpages/test/etched.jpg>
>>>
>>> In comparison I imaged an "uncolored glass" filter. The pattern has
>>> regular undulations, minute bubbles and wrinkles. Toatally
>>> unexpected.
>>>
>>> <http://home.comcast.net/~nghy//mywebpages/test/other.jpg>
>>>
>>> I expected to see something similar to the sand blasted edge found on
>>> slides that have a random faceted appearance.
>>>
>>> Aaron
>>>
>>>
>>>
>>>
>>> On Sun, 01 May 2005 05:28:57 GMT, "GTO" <gregor_o@xxxxxxxxxxxxxxxx>
>>> wrote:
>>>
>>>>Einen schönen guten Morgen!
>>>>
>>>>
>>>>
>>>>Excellent point! This could explain some new designs that are recently
>>>>sold.
>>>>One example is the fly–eye optics design by Nikon (see Eclipse 80i),
>>>>which
>>>>are used to ensure even illumination.
>>>>
>>>>
>>>>
>>>>I just looked at the Leitz Ortholux lens in the illuminator, and
>>>>although
>>>>it
>>>>looks like a "frosted" lens at first sight, it is possible that also
>>>>Leitz
>>>>created the mat surface using a similar process (?). How big are these
>>>>bowl–like concave hollows in the lens–surface?
>>>>
>>>>
>>>>
>>>>Nette Grüsse aus Kalifornien,
>>>>
>>>>
>>>>
>>>>Gregor
>>>>

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>>>>

>>>>...

>>>>> reading your questions to Andy Resnick and earlier contributions in
>>>>> this thread, it seems to me, the term "frosted" does not take into
>>>>> account properly, that the first lens-surface of some Zeiss
>>>>> lamp-collectors is not ground. Its mat surface is achieved by
>>>>> hydrofluoric acid, which leaves thousands of little bowl-like concave
>>>>> hollows in the lens-surface. They are of different diameters, but all
>>>>> of the same focus-width - tiny concave lenses on the surface of a
>>>>> concave lens.

>>>>>

>>>>> The result is, that light-rays are not being scattered in all
>>>>> directions, as would be the result of a simple ground glass, but the
>>>>> light beams entering the first collector lens, are just "widened" and
>>>>> defocussed, changing the image of the lamp filament into a homogeneous
>>>>> image, mixed together out of thousands of little lenses. This design
>>>>> does not fully destroy the definition of the field diaphragm.

>>>>>

>>>>> Frosted in that special way the lighting force is reduced about
>>>>> 20-40%; that is not much, compared with reduction of 60-80% through a
>>>>> normal ground glass.

>>>>>

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• *Follow-Ups:*

◆ **Re: Köhler illumination question...**

◇ *From:* Aaron

• *References:*

◆ **Re: Kohler illumination question...**

◇ *From:* Aaron

◆ **Re: Kohler illumination question...**

◇ *From:* Klaus Henkel

◆ **Re: Köhler illumination question...**

◇ *From:* GTO

◆ **Re: Köhler illumination question...**

◇ *From:* Aaron

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