III — Vacuum Processing Techniques — III
Contd.

Abstract No and References

in a number of micrographs attached to the article. On deposition the atoms tend to agglomerate on the surface in units of circular shape. This circular formation can be explained by the fact that the binding of one metal atom to another is large compared with the binding of the metal atom to the organic material, composing the substrate. At a later stage these units tend to link and form a linear bead-like pattern. It is now clear that this latter formation is due to the influence of the structure of the substrate material and in particular to the linear molecules in this material. In order to clarify this condition nitro-cellulose separated into groups of uniform polymer lengths was dissolved in amyl-acetate and thin substrate films formed from the solution. Gold and silver films between 10-20 Å in thickness were deposited on to this substrate and showed a distinctly linear formation dependent on the polymer length of the substrate. It appears that this technique could be useful if applied to the investigation of molecular lengths in the range of 100 to 1,000 Å.

Sommaire : Etude de la relation de la structure du support avec la structure du film métallique déposé. Il est suggéré que la technique de métallisation par évaporation sous vide pourrait faciliter l'étude des longueurs moléculaires dans la région 100-1,000 Å.

Paper by M. S. Blois, Jr. *Science* 114, 17.8.51. 175-177

Surface Treatment of Lenses

8/III

United Kingdom. H. D. Taylor of York, the designer of the Cooke Triplet photographic lens (1896) was the first to discover that tarnishing of glass surfaces increases the transmission of light through the lens and at the same time reduces the reflection of light from the surface. Gershun in Russia and F. E. Wright in the U.S.A. studied this phenomenon during the period of the First World War. But not until 1935 was a proper method developed for the production of an anti-reflection layer of low refractive index on a glass surface (J. Strong). Today, there are three methods available for the production of such coatings; (1) the leaching process, (2) the spinning process and (3) the vacuum coating process. Untreated lenses reflect up to 5% of the incident light at the air-to-glass surface. After treatment this figure is reduced to 1% and the transmission increased to 98.8%. Absorption accounts for 0.2%. The layers are usually formed from magnesium-fluoride or cryolite and should have the thickness of approximately a $\frac{1}{4}$ of the wavelength of the light transmitted. The refractive index should be approximately equal to the square root of the index of the glass treated. If light strikes a coated lens, light waves are reflected from the surface of the coating and from the surface of the actual lens. The second set of reflected waves will be out of step with the first because the light has travelled further. If the two sets are out of phase by a fraction of one wavelength, the reflections will interfere with each other and under optimum conditions cancel each other. As a result the over-all reflection will be reduced and the energy originally constituting the reflected light will now reinforce the transmitted light. Details are given of the vacuum evaporation method for the prepartion of anti-reflection films.

Sommaire : Discussion de la théorie de la reduction de la réflexion par le 'blooming' des lentilles. Les méthodes produisant de telles couches sont discutées.

Article by J. Adams *P.D.A. Journal* Sept. 1951 28-33

Density Control in the Manufacture of Rhodium Filters

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United Kingdom. The author comments on difficulties encountered when producing rhodium filters of low optical density :—(1) After completion of the deposition process, the density value of the filter continues to increase for an appreciable time before stability is reached. (2) Burnishing changes the value of density finally arrived at. (3) In the case of small filters, the reduced density near the border of the filter has an appreciable effect on the average density of the filter.

Sommaire : Les difficultés sont discutées qui se sont présentées dans la fabriquation des filters en rhodium à faible densité optique.

Letter by W. Zehden *Vacuum* 1, Jan. 1951 38-39

On the Production of Diffraction Grating—I. The Copying of Plane Gratings

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See Abstract No. : 28/I

Observations on the Metallisation of Surfaces by Evaporation in a Vacuum

11/III

France. The author discusses the cleaning of supports for the deposition of metals by evaporation *in vacuo.* He refers to the conventional procedure by ionic bombardment and points out that cleaning by this method is not always satisfactory. As an alternative he suggests bombardment by electrons produced by thermionic emission. He gives details of a suitable arrangement and advice on its use. Discussing filaments used as crucibles he remarks that he found tantalum more satisfactory than tungsten. Tantalum filaments stay malleable where tungsten becomes brittle.

Sommaire : Un aperçu des avantages que présentent les méthodes de bombardment electronique appliquées au nettoyage de supports à métalliser sous vide. On fait aussi remarquer que le tantale peut parfois remplacer avantageusement le tungstène comme matériau de creuset.

Note by L. Dunoyer *C.R. Acad. Sci. Paris* 233, No. 17, 1951 919-921

Contamination of Evaporated Films by the Supporting Material of the Source

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See Abstract No. : 33/I