# A B S T R A C T

" X- Ray Studies on the Pyrolysis of Cellulose Fibers "

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Some x-ray-structure-phenomena of carbon-fibers which are produced by thermal degradation of rayon-fibres are described.

Stretched rayon-fibers show a distinct preferred orientation of x-rayreflections in the wide and small angle range. During thermal degradation the texture in the wide angle range is completely destroyed because of the breakdown of the cellulose lattice. Following a thermal treatement up to 1000° C only a very diffuse equal diffraction halo near the (002)- reflection of graphite can be observed. The preferred orientation of the lowanglescattering intensity distribution in contrary rests nearly undisturbed during the thermal treatement. It is only superposed by an additional scattering which could be interpreted as coming from hollows or particles. The lowanglescattering of cellulose normally is described as produced by the arrangement of the cellulose macromolecules to fibrils. Therefore during thermal decomposition of cellulose to carbon fibers, the fibrils should rest intact. It can be shown that this conception should be regarded criticaly, because the fibril model only pays regard to a part of the factors producing scattering of X-rays.
During the graphitization of carbon fibers lowanglescattering becomes complex. An interpretation of the scattering as superposition of a particlescattering to the fibril scattering is attempted.
After thermal treatement of carbon fibers up to 2900° C, there arises again a fiber texture in the wideangle scattering, similar to the texture of the cellulose fibers used. This memory seams to be caused by the fibrillar arrangement of the beginning cellulose.

The molecule lattice of the cellulose turns to an arrangement of two-dimensional layers. During this process it looses all the oxygen and hydrogen and a recombination of C-fragments starts. It is attempted to describe the change of the amorphous carbon structure between 1000° C and 2900° C using the different theories of X-rayscattering for nongraphitic carbons.