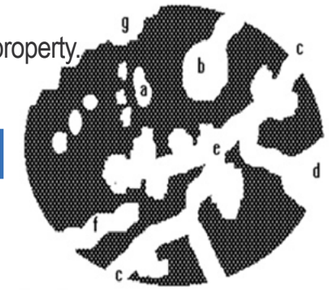
WaterCarb
Activated Carbon

ACTIVATED CARBON

CEYKA®
the water company
www.ceyka.com.tr

DEFINITION

Activated carbon is a carbonaceous material characterized by a well developed pore structure and a very large internal surface area.
These characteristics provide activated carbon with a very strong adsorptive property.



PORE STRUCTURE OF ACTIVATED CARBON

a – micropores
b , f – mesopores (spherical and cilindrical)
c , e , d, – macropores (passing, internal, superficial)

RAW MATERIAL

Activated carbon is mainly produced from

– coal – coconut shell – wood

The yield of activated carbon is in the range between 15-35 % depending upon the raw material
Generally coal gives high yield (30-35%) while coconut shell gives a lower yield (15-20%)
The approximate carbon content for different raw materials is shown in table 1

TAB. 1 – APPROXIMATE CARBON CONTENT OF RAW MATERIALS

MATERIAL	CARBON CONTENT(%)
Coal	65-70%
Coconut shell	40-45%
Wood	35-40%

CLASSIFICATION OF ACTIVATED CARBON

GRANULAR

- Mainly used for water treatment (potable, urban and industrial waste water)
- Different mesh size
- Different starting material (coconut, mineral, vegetal)

EXTRUDED (PELLET)

- Mainly used for air treatment
- Different diameter 2 – 3 – 4 mm (most common)
- Generally mineral based

POWDER

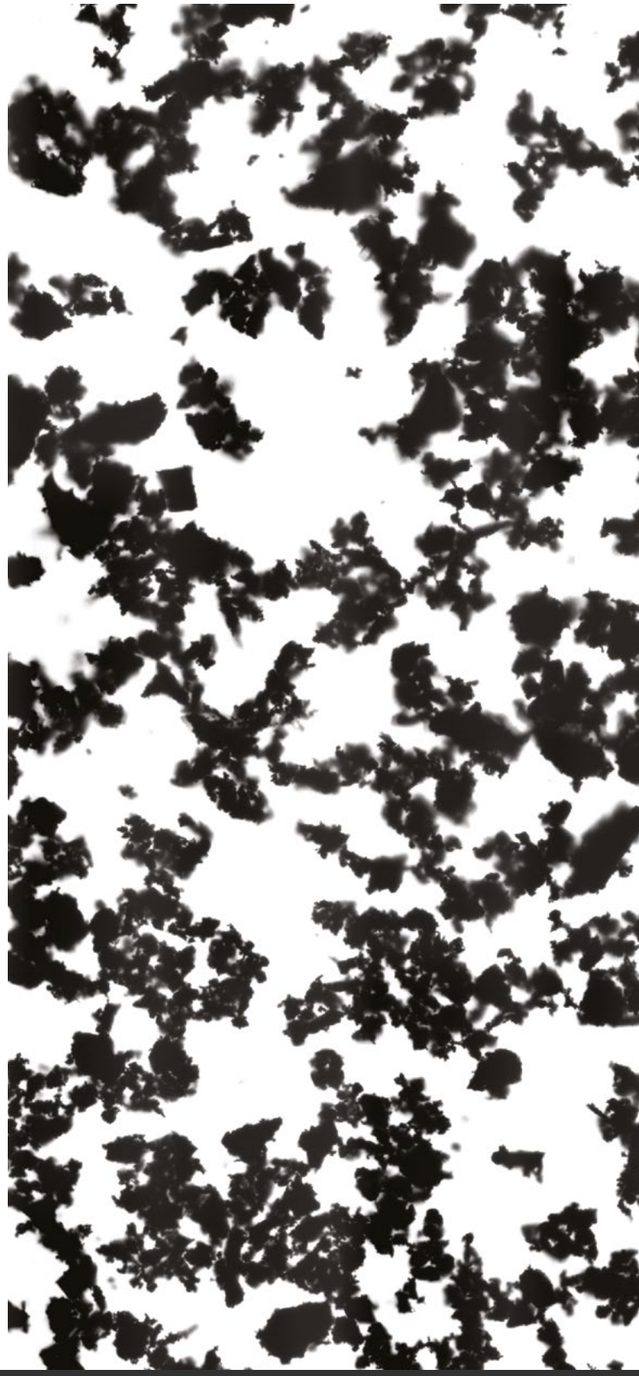
- Used for water treatment (drinking and waste)
- Industrial process (wine industry, pharmaceutical, food industry)
- Air treatment (incinerators)
- Size: generally under 325 mesh
- Different raw material (coal, coconut, vegetal)

CHARACTERIZATION OF ADSORPTION CAPACITY

The adsorption capacity of activated carbon is determined mostly by two factors.

INTERNAL SURFACE AREA

Its determined by mean of N2 adsorption and represent the surface area of the activated carbon and it is expressed in m2/g
Internal surface area varies in the range 500-1800



PORE SIZE DISTRIBUTION

Micropore: 0-20 A°
Mesopore: 20-50A°
Macropore: > 50 A°

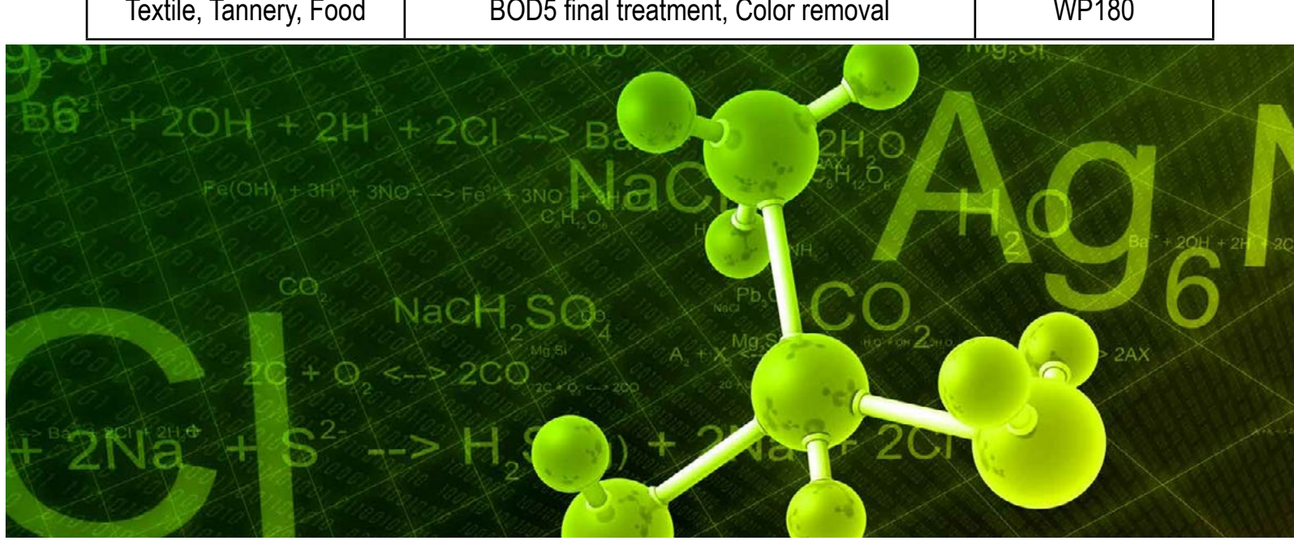
Micropores and mesopores are supposed the be the most effective for the adsorption phenomenon and represent 80-90 % of the pore distribution.
Distribution of pores depends upon the starting material.
Coconut shell a.c. have a predominance of micropore (roughly 90%)
Coal based a.c. have a wide pore distribution (micropore/mesopore distribution is 60/30%)
Wood – peat based a.c. have high proportion of macropore (40-50%)

PACKING

PRODUCTS

WATER TREATMENT

TYPE OF WATER	PROCESS	TYPE OF CARBON
POTABLE WATER	Removal of organic compounds (pesticides, solvents…) Removal of organic compounds due to algae degradation/humic subs.	1000, P900, 800, WP180
WASTE WATER Civil	Enhancement of Biological Process(I.B.T.)COD – BOD5 final treatment	1000, P900, 800, WP180
WASTE WATER Industrial Textile, Tannery, Food	Enhancement of Biological Process(I.B.T.)COD – BOD5 final treatment, Color removal	1000, P900, 800, WP180



INDUSTRIAL PROCESS

TYPE OF WATER	PROCESS	TYPE OF CARBON
ENOLOGICAL INDUSTRY	Wine decolorization	1000, P900, 800, WP180
SUGAR, STARCH…	Decolorization	WP series
FRUIT JUICE	Decolorization	WP series
CITRIC ACID, TARTARIC ACID	Decolorization	WP series

AIR TREATMENT

INDUSTRIAL EMISSION	PROCESS	TYPE OF CARBON
Automotive Industry	Solvents Recovery	S400 , S450 , SC450
Paint Production	Solvents Recovery	S400 , S450 , SC450
Printing, Adhesive tape	Solvents Recovery	S470, S480 , SC450
Food industry	Odor removal	S400
Chemical, Petrochemical, Refinery	Hydrocarbons vapor, Sulfide removal Mercaptans	S400S, 470SPI-402, SSH-407
Incinerator (U.S.W.)	Dioxin, Mercury	P900P900S
CIVIL EMISSION	**PROCESS**	**TYPE OF CARBON**
Biological plants	Odor removal (Screening, Thickening, dehytration)	S400SPI-402
Sewage system	Pumping pits	S400SPI-402

APPLICATIONS

- WATER TREATMENT
- GAS – AIR TREATMENT
- PERSONEL PROTECTION
- FOOD INDUSTRY
- CHEMICAL INDUSTRY
- PHARMACEUTICAL INDUSTRY
- CATALYSTS

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