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Conclusions

- sticking plasters for medical applications prepared on the basis of the acrylic emulsion self adhesive glues are radiation resistant up to a dose level of 40 kGy;
- properties of the irradiated glue are improved, the adhesive dose is not changing and the cohesion increases. The elaborated glue is suitable for sticking plasters or self adhesive tapes contacting with living human tissue.

Reference

[1]. Krenceski M, Johnson J.J, Temin S.C.: Macromol. Chem. Phys., C26(1) (1986).

PARTICLE TRACK MEMBRANES IN A CORONA DISCHARGE FIELD

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Particle track membranes (PTMs) are advanced technology products manufactured by cyclotron technique. Thin polymeric film is bombarded by accelerated heavy ions beam and then processed with a photochemical treatment (UV sensitization and chemical etching). The result is a thin microporous membrane with geometrically perfect cylindrical pores and a smooth, flat surface. A typical polymeric material for PTMs is a polyethylene terephtalate (PETP) film, 10-15 μm in thickness. Another features of PTMs made of PETP film are: good mechanical strength, good chemical, thermal resistance and very high radiation resistance. The characteristic values of PTMs are: pore size in the range from 3.0 to 0.2 μm and surface pore density, respectively from 10^6 to 10^9 pores/cm^2.

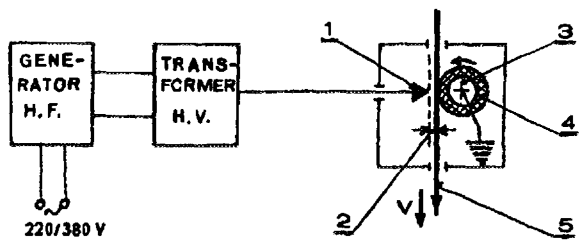

Fig.1. The device for corona discharge activation of polymer films: 1 - a multi-edge electrode, 2 - the air gap, 3 - a cylindrical electrode, 4 - an isolator, 5 - the moving strip of a membrane.

PTMs can be used for microfiltration including microbiological cleaning in: biochemistry, microbiology, medicine, pharmacy, biotechnologies, environmental monitoring [1, 2].

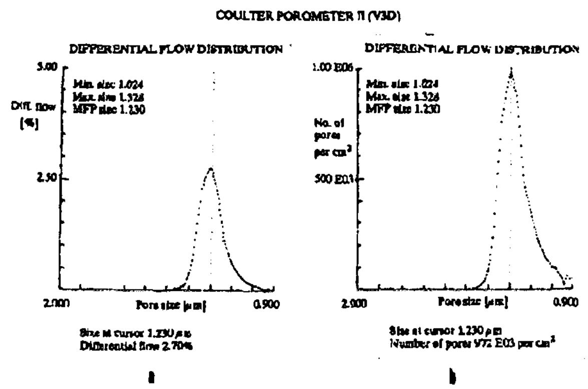

Fig.2. Parameters of the PETP particle track membrane from Coulter Porometer II instrument: a - differential flow distribution, b - differential pore number distribution.

Because of the wide range of possible applications it is a need for the modification of surface properties of PTMs, among others for preparing multilayer devices. One method for such a modification is the corona discharge activation. PTMs samples have been treated with a corona discharge using an industrial type activator in METALCHEM Centre, Toruń, Poland (Fig.1). The high voltage was 10-20 kV with a frequency of 10-40 kHz [3].

A sample of a particle track membrane was taken for experiments. The main filtrating parameters of the PTM, obtained with a Coulter Porometer II

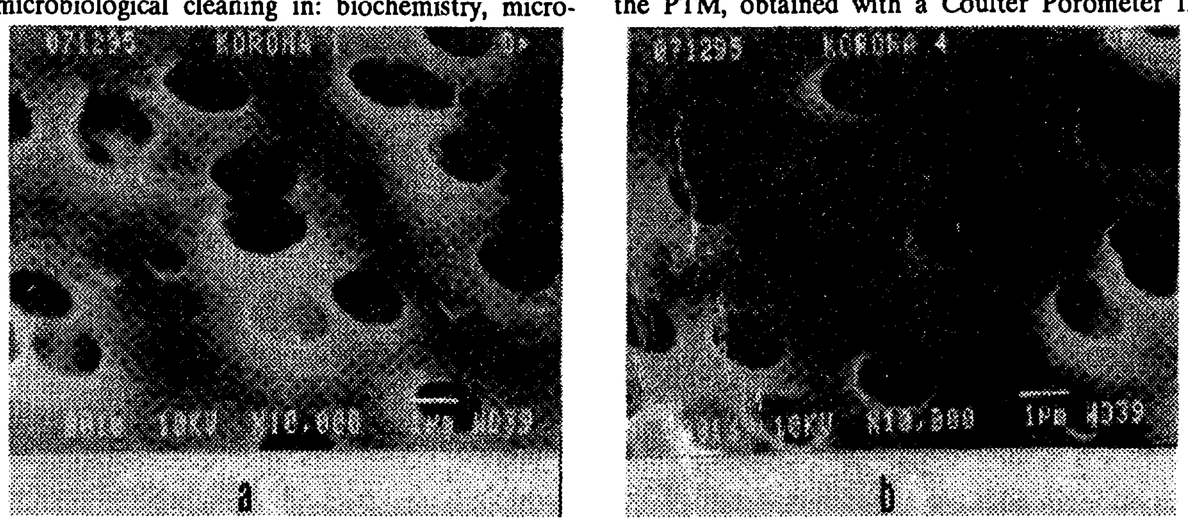

Fig.3. SEM photograph of PTM surface after the corona discharge: a - high velocity of membrane moving, b - small velocity of membrane moving (near region of spark discharge).

instrument, were the following: mean value of pore size - 1.23 μm, surface pore density - $1.3*10^7$ cm^{-2}, permeability - 54 litre*min^{-1}*cm^{-2} (Fig.2). A strip of such PTM was moved between the electrodes during the corona discharge with a fluent change of velocity (Fig.1).

Unitary energy of activation depends on the velocity of the moving membrane strip between the electrodes. In the case of too small velocity the corona discharge changes into the spark discharge which causes the local destruction of the membrane. When the velocity is higher one cannot observe changes on the surface of the membrane by SEM photography (Fig.3), and also it is no change in filtration parameters.

In conclusion one can say that the corona discharge activation is a good method for changing of the surface energy of the particle track membranes. Before such treatment it is necessary to choose proper parameters of activation such as high voltage and velocity of the moving membrane strip.

References

[1]. Proc. of the 2rd Meeting on Particle Track Membranes and Their Applications, Szczyrk, Poland, 2-6 December 1991. INCT, Warszawa 1992, pp. 90.

[2]. Proc. of the 3rd Conf. on Particle Track Membranes and Their Applications, Jachranka, Poland, 26-29 October 1993. INCT, Warszawa 1995, pp.123.

[3]. Ratajczak Z.: Aktywowanie folii z PE i PP. Poradnik. OB-RMiUCh, METALCHEM, Toruń 1995, 17p.

EB POLLUTANTS REMOVAL PROCESS FROM MODEL GASES WITH HIGH SO_2 CONCENTRATION

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The emission of noxious pollutants (SO_2 among them) into the atmosphere from the heavy industry activity is of growing concern and this has generated an interest in finding viable and cost-effective solutions to SO_2 pollution control. By-products produced in such a technology are also of great importance. In the case of SO_2 removal in principle they are: concentrated SO_2, sulfuric acid, elemental sulfur or ammonia sulfate.

In the recent years for the removal of SO_2 and NO_x from flue gases an electron beam process has been developed. Up to now the technology has been applied for the flue gas treatment with SO_2 concentrations up to 3000 ppm. The goal of this work is to check the possibility of applying the process for industrial gases with a high SO_2 concentration (up to 15% vol.). This range of SO_2 concentration is encountered in industrial off-gases released in processes applied in the copper industry. Because it is well known that SO_2 in the eb process is removed mostly by a thermochemical reaction and partly by a radiation induced reaction only, the energy transfer (G factors) for SO_2 transformation being limited, therefore other modifications of the process are studied to improve the reaction efficiency.

The laboratory unit in the Institute of Nuclear Chemistry and Technology [1, 2] has been used for

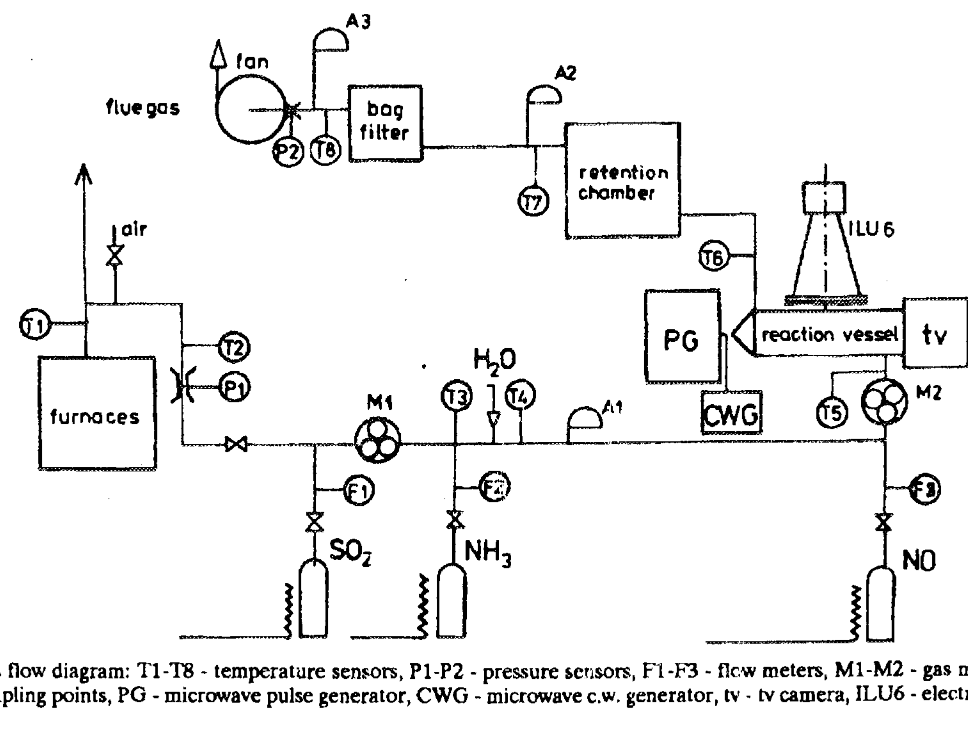

Fig. Process flow diagram: T1-T8 - temperature sensors, P1-P2 - pressure sensors, F1-F3 - flow meters, M1-M2 - gas mixers, A1-A3 - gas sampling points, PG - microwave pulse generator, CWG - microwave c.w. generator, tv - tv camera, ILU6 - electron acelerator.