STRUCTURE OF YTTRIUM AND/OR PHOSPHORUS-CONTAINING MICROSPHERES PREPARED BY SOL GEL METHOD

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Microspheres containing yttrium (Y) and/or phosphorus (P) around 20 μm - 30 μm are useful for radioembolization therapy because they are activated to β- emitter by neutron bombardment and infused in blood vessels in the neighborhood of tumors to irradiate β- rays to the tumors.

Yttrium and/or phosphorus-containing glass microspheres about 20 μm in size were obtained when an aqueous solution of YCl_3 and/or $AlCl_3$ were added to tetraethyl orthosilicate (TEOS) [acetic acid or phosphoric acid was used to catalyze the hydrolysis and condensation of TEOS] and was pumped into silicone oil under constant stirring. The shapes of the particles produced by this method are regular and nearly spheric in shape.

The spherical shapes, composition and element distribution were investigated by scanning electron microscopy (SEM), carbon/sulfur analysis and SEM/EDS analysis. Paper chromatography was used to identify radiochemical impurities in the radioactive microspheres. The radionuclide purity was determined using a gamma spectrometry system and an ultra-low-level liquid scintillation spectrometer.

The results indicated that the proposed silicone oil spheroidization method is suitable for the production of yttrium silicate and Yttrium phosphorus silicate microspheres. The advantage of this method over other methods is that high temperatures and P^+ ion implantation are not required. Moreover, large quantities of sphere are produced at a high rate, and isodiametric spheres can be synthesized that do not require screening.

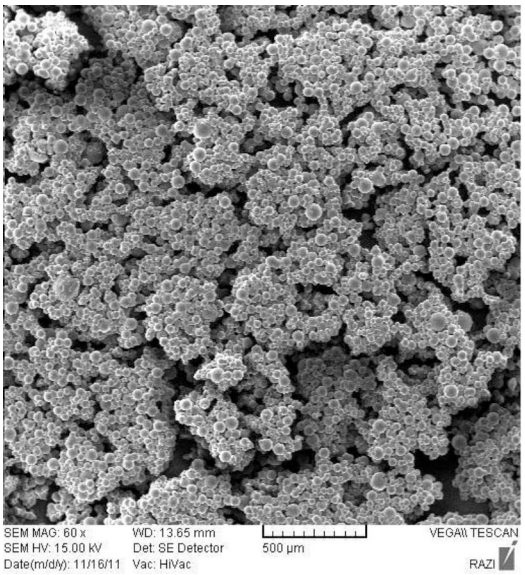

Fig 1. *SEM of yttrium silicate microspheres*

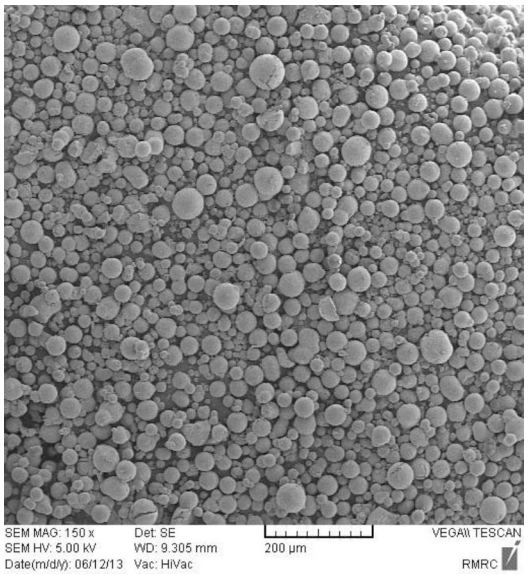

Fig 2. *SEM of Yttrium phosphorus silicate microspheres.*