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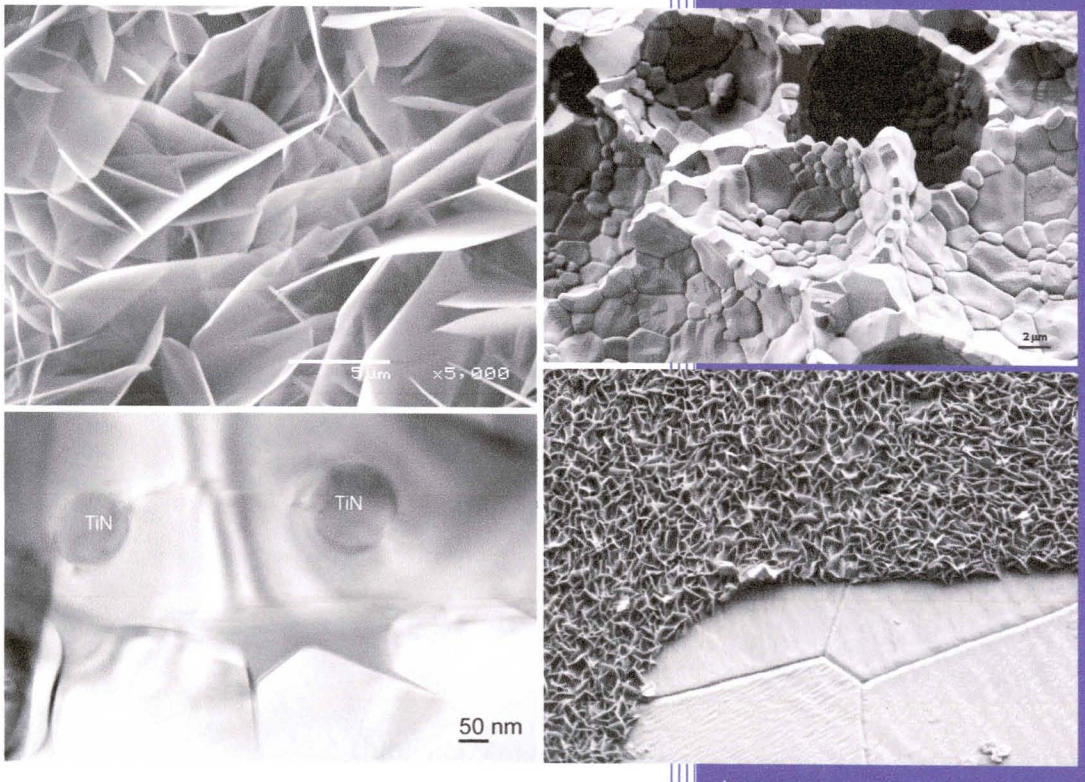

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Sonochemical synthesis of platinum nanoparticles and their composite with hydroxyapatite

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Sonochemical method has a significant role in structural and morphological properties especially for the synthesis of noble metal nanoparticles. In the case of these materials reactive radicals formed during sonification are involved in reduction process. Depends on the rate of formation of these particles the rate of their growth is affected resulting in different structure and morphology.

Homogeneous sonochemically-assisted precipitation was applied for the synthesis of platinum (Pt) nanoparticles and their composite with hydroxyapatite (HAp/Pt). In this method urea was used for complexation of Pt and/or precipitation of HAp while chloroplatinic acid (H_2PtCl_6, $T_m=60^0C$) and platinum(II)2,4 pentanedionat ($C_{10}H_{14}O_4Pt$, $T_m=250^0C$) were applied as Pt-precursors with different thermal and reduction potential properties. In the case of H_2PtCl_6, pre-formed platinum-complex formed submicrometer spheres with smooth surfaces. After reduction these spheres kept their size and turned into nanostructures. A similar transformation was noticed when $C_{10}H_{14}O_4Pt$ was applied. However, in this case pre-formed platinum-complex particles had polyhedral shapes and further reduction resulted in the same shape of formed Pt nanostructures. Morphological and structural properties of Pt obtained during formation of their composites with HAp changed further on. Application of both precursors resulted in formation of plate- and rod- like shape of Hap. However, composites obtained from H_2PtCl_6 resulted in formation of nanosized while $C_{10}H_{14}O_4Pt$ resulted in formation of micrometer sized HAp particles. Pt particles attached on the surface of Hap particles were nanosized and non-agglomerated spheres. Obtained results show that sonochemical method can be used for tailoring the properties of Pt nanoparticles by selection of the type of precursor.