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Introduction

Colloids are a class of sol tions comprising particles ranging from 1 to 1000 nanometers in diameter. ese particles; termed colloidal particles; e hibit niq e properties d e to their si e; shape; and s rface characteristics. Unlike tr e sol tions here sol te particles are molec larl dispersed; colloidal particles remain dispersed thro gho t the sol ent; forming colloidal dispersions. is phenomenon; kno n as colloidal stabilit ; is cr cial in ario s elds s ch as pharmace ticals; cosmetics; food science; and en ironmental engineering. e nanoscale dimension of colloids imparts them ith distinct optical; electrical; and mechanical properties; making them al able in nanotechnolog applications. Understanding the beha ior of colloids at the nanoscale is f ndamental for designing ad anced materials; dr g deli er s stems; and f nctional Nano de ices [1-3].

Background of colloids

Colloids ha e intrig ed scientists for cent ries d e to their niq e

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(FTIR); and scanning electron microscop (SEM) ere emplo ed to anal e the str ct ral; morphological; and compositional properties of colloidal nanoparticles [5-7].

Result and Discussion

Results

e e perimental res lts re ealed the formation of stable colloidal dispersions ith ell-de ned particle si es and niform distrib tion. D namic light scattering meas rements indicated narro si e distrib tions; ith a erage particle diameters range from 10 to 500 nanometers; depending on the s nthesis method and conditions. Zeta potential meas rements demonstrated the electrostatic stabilit of colloids; ith high absol te eta potentials indicating rep lsi e forces that pre ent particle aggregation. e str ct ral anal sis sing X-ra di raction con rmed the cr stalline nat re of certain colloidal