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We propose a method for on-line elemental analysis of gas phase synthesis of nanoparticles based on Laser-Induced Breakdown Spectroscopy (LIBS). LIBS is a method of chemical analysis that offers many advantages. It allows remote specific detection of most of the chemical elements in a sample and at very low concentrations. Here we propose a new experimental setup by performing the laser-particle interaction in vacuum. A small part of the aerosol stream is sampled and driven to an aerodynamic lens system. The latter produces a dense and collimated beam of nanoparticles under vacuum from the atmospheric pressure aerosol flow. The laser-particle interaction takes place under vacuum. The photon signal from the plasma is collected by an UV-compatible optical fiber connected to a spectrograph. As the interaction takes place at low pressure, the photons are emitted only from particles. Unlike previous experiments, the background from interaction with the gaseous component is totally eliminated. Moreover, as the nanoparticle beam is highly collimated, the optical interfaces are not obstructed by particle deposition and the system can be kept running for hours. The proof of concept is performed with $Li_xTi_yO_z$ nanoparticles synthesized by laser pyrolysis. With a 5 kHz laser focused in order to have at least 10 GW/cm^2 intensity on the particle beam. Exploitable spectra are recorded in few seconds, allowing for continuous on-line monitoring of particle elemental composition.