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Polymerase chain reaction efficiency improved by gold nanoparticles immobilized at the micro-reactor surface

Sabrina Conoci[1], Salvatore Petralia[1], Maria Grazia Amore[1], A Marzorati[2], G Ferrari[2] D Russo[2], Giuseppe Nocito[3] and Salvatore Sortino[3]
[1]STMicroelectronics, Italy
[2]Clonit, Italy
[3]University of Catania, Italy

Metal nanoparticles are widely employed in molecular biology as facilitators of the Polymerase Chain Reaction (PCR) for the improvement of the efficiency. Various metal nanoparticles such as Pt, Ag and Au with various molecular capping layers have been investigated with this purpose. The efficiency enhancement mechanism is described in the literature as mainly due to both the excellent heat dispersion by the nanomaterial and the surface interaction with the DNA template and DNA-polymerase. There are very few examples reporting metal nanoparticles PCR facilitators immobilized on the micro-reactor surface. This is a key point for the development of genetic Point-of-Care (PoC) devices. In this contribution, we report the effect of gold nanoparticles immobilized at a micro-reactor surface on Real-Time PCR. The gold nanoparticles were prepared with the standard chemical reduction method and have been immobilized on plastic micro-reactor surface by casting mode. The PCR efficiency was evaluated in presence of different amounts of nanoparticles. The results prove that the nanomaterial is able to increase the polymerase chain reaction efficiency of about 1 Ct (corresponding to about one order of magnitude). The proposed approach is very promising for the application on PoC molecular diagnostics applications.

Biography

Sabrina Conoci has received the Master of Science in Industrial Chemistry cum laude from the University of Bologna (Italy) in 1995 and has obtained her PhD in Engineering of Materials from the University of Lecce (Italy) in 2001 working one year at the University of Ottawa (Canada). Since 1999, she has been with STMic, Catania (Italy), covering several R&D positions in the field of nano-molecular devices, biosensors and biotechnologies. She is currently R&D Manager of the Advanced Sensor Technologies team. He has published more than 200 papers in reputed journalism, 15 international patents and more than 100 communications to international congresses.

sabrina.conoci@yahoo.it

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