TITOLO PROGETTO

ECCell - Electronic Chemical Cell
Linea finanziamento: VII FP - Cooperation
Area Scientifico Disciplinare: 15a Scienze e tecnologie per una società dell'informazione e della comunicazione

STRUTTURA (Dipartimento/Centro)
European center for living technology

DOCENTE RESPONSABILE SCIENTIFICO
POLI Irene

DATI FINANZIARI

Costo Complessivo del Progetto	Finanziamento Complessivo Assegnato	Costo totale delle attività a Ca' Foscari	Assegnazione Complessiva a Ca' Foscari
2.628.168	**2.300.000**	**89.334**	**75.000**

INIZIO ATTIVITA' (previsione)
2008

FINE ATTIVITA' (previsione)
2011

ABSTRACT PROGETTO

The aim of the project is to establish a novel basis for future embedded information technology by constructing the first electronically programmable chemical cell. This is naturally a high-risk, embryonic research project, but aimed at a breakthrough which will lay the foundation for immersed micro- and nanoscale molecular information processing with a paradigm shift to digitally programmable chemical systems. Chemical cells must combine self-replication, self-containment and self-regulation of resources (metabolism) enabling evolution to qualify as alive. ECCell will employ novel families of fully synthetic hybrid informational polyelectrolyte copolymers (not simply DNA), which simultaneously support all three cell functionalities. Their microscopic multiphase self-assembly under electric field control is the primary information processing mode of this technology. Realtime digital electric field control sequences, regulating the semi-autonomous self-assembly and reactive molecular processing, will both provide an online programming methodology for these complex systems and potentially serve as electronic genomes for the chemical cells. Programming methodologies (beyond optimal control theory) will be explored and evaluated which deal effectively with the remote real time distributed regulation of these novel semi-autonomous combinatorially complex chemical systems. The research will establish an effective IT interface between microelectronic and molecular information processing, by demonstrating its use to achieve a hard chemical synthetic systems objective (an artificial cell) opening a platform for programming a novel chemical living technology at the microscale.