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Electro-grafted Organic Memristors as Synapses: Spike Timing-Dependent Plasticity and Supervised Function Learning

Yu-Pu Lin, Christopher H. Bennett, Damir Vodenicarevic, Djaafar Chabi, Damian Querlioz, Théo Cabaret, Adrian Balan, Bruno Jousselme, Christian Gamrat, Jacques-Olivier Klein, et al.

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LIN Yu-pu

Objet: TR: Abstract detail

----- Mail transféré -----
De: "Administrateur EMRS" <direttore-imem@imem.cnr.it>
À: "yu-pu lin" <yu-pu.lin@cea.fr>
Envoyé: Mercredi 9 Mars 2016 14:26:57
Objet: Abstract detail

Dear yu-pu LIN,

The abstract Electro-grafted Organic Memristors as Synapses: Spike Timing-Dependent Plasticity and Supervised Function Learning has been ACCEPTED for oral presentation at the E-MRS 2016 Spring Meeting.
Your presentation is scheduled for 03/05/2016 - 11h15 - session 2 – ref. 2.
The Full conference program is available on http://www.emrs-strasbourg.com/index.php?option=com_abstract&task=view&year=2016&Itemid=90&id_season=15
We encourage you to register online to the conference http://www.emrs-strasbourg.com

For your convenience we include below the details of your abstract.

Best regards,

The Symposium Organizers

Abstract ID : E6CNW

Abstract Title : Electro-grafted Organic Memristors as Synapses: Spike Timing-Dependent Plasticity and Supervised Function Learning
Submitted to symposium B : Adaptive materials: devices and systems towards unconventional computing, sensing, bio-electronics and robotics of the E-MRS 2016 Spring Meeting, which will be held at the Congress Center in Lille (France) from May 2 to 6, 2016.
by Authors : Yu-Pu. Lin, Christopher H. Bennett, Damir Vodenicarevic, Djaafar Chabi, Damian Querlioz, Théo Cabaret, Adrian Balan, Bruno Jousselme, Christian Gamrat, Jacques-Olivier Klein, Vincent Derycke
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Abstract :
Neuromorphic computing is an efficient way to handle complex tasks such as image recognition and classification. Hardware implementation of an artificial neural network (ANN) requires arrays of scalable memory elements to act as artificial synapses. Memristors, which are two-terminal analog memory devices, are excellent candidates for this application as their tunable resistance could be used to code and store synaptic weights. We studied metal-organic-metal memristors in which the organic layer is a dense and robust electro-grafted thin film of redox complexes. The process allows fabricating planar and vertical junctions, as well as small crossbar arrays. The unipolar devices display non-volatile multi-level conductivity states with high Rmax/Rmin ratio and two thresholds. We characterized in depth the characteristics of individual memristors with respect to the targeted synaptic function. We notably showed that they possess the Spike Timing-Dependent Plasticity (STDP) property (their conductivity evolves as a function of the time-delay between incoming pulses at both terminals), which is critical for future applications in neuromorphic circuits based on unsupervised learning. In parallel, we implemented

memristors as synapses in a simple prototype: a mixed circuit with the neuron implemented with conventional electronics. This ANN is able to learn linearly separable 3-input logic functions through an iterative supervised learning algorithm inspired by the Widrow-Hoff rule.

Abstract Type : Oral presentation preferred
Will submit a paper ? no

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Sincerely yours,
E-MRS Headquarters