CNT and the second CNT of the plurality of electrical circuits may be intertwined and in electrical communication with each other, such that the plurality of electrical circuits form a mat. The electrical device can further include a carrier material interposed between adjacent electrical circuits of the plurality of electrical circuits. The plurality of electrical circuits may be a plurality of light emitting diodes.

In another example, an electrical device can include an electrical circuit, a first carbon nanotube (CNT) catalyst layer including a first CNT catalyst plug electrically coupled to the electrical circuit, a first CNT electrically coupled to the first CNT catalyst plug, a second CNT catalyst layer including a second CNT catalyst plug electrically coupled to the electrical circuit, and a second CNT electrically coupled to the second CNT catalyst plug, wherein the electrical circuit is interposed between the first CNT catalyst layer and the second CNT catalyst layer. The electrical device may be a diode. The electrical device may further include a substrate having a first electrically conductive pad and a second electrically conductive pad, a first electrical conductor that electrically couples the first CNT to the first electrically conductive pad, and a second electrical conductor that electrically couples the second CNT to the second electrically conductive pad. The substrate may be a printed circuit board.

According to an aspect, there is provided an electrical device, comprising: a plurality of electrical circuits, wherein each electrical circuit comprises: a first carbon nanotube (CNT) catalyst layer comprising a first CNT catalyst plug electrically coupled to the electrical circuit; a first CNT electrically coupled to the first CNT catalyst plug; a second CNT catalyst layer comprising a second CNT catalyst plug electrically coupled to the electrical circuit; and a second CNT electrically coupled to the second CNT catalyst plug, wherein the electrical circuit is interposed between the first CNT catalyst layer and the second CNT catalyst layer. The first CNT and the second CNT of the plurality of electrical circuits are intertwined and in electrical communication with each other, such that the plurality of electrical circuits form a mat.

According to another aspect, there is provided an electrical device, comprising: an electrical circuit; a first carbon nanotube (CNT) catalyst layer comprising a first CNT catalyst plug electrically coupled to the electrical circuit; a first CNT electrically coupled to the first CNT catalyst plug; a second CNT catalyst layer comprising a second CNT catalyst plug electrically coupled to the electrical circuit; and a second CNT electrically coupled to the second CNT catalyst plug, wherein the electrical circuit is interposed between the first CNT catalyst layer and the second CNT catalyst layer.

According to another aspect, there is provided an in-process electrical circuit within a chamber of a furnace, the in-process electrical circuit comprising: a circuit layer comprising a first surface and a second surface opposite the first surface; a first carbon nanotube (CNT) catalyst layer comprising a first CNT catalyst plug on the first surface of the circuit layer, wherein the first CNT catalyst

plug is electrically coupled to the circuit layer; a first CNT contacting and electrically coupled to the first CNT catalyst plug; a second CNT catalyst layer comprising a second CNT catalyst plug on the second surface of the circuit layer, wherein the second CNT catalyst plug is electrically coupled to the circuit layer; and a second CNT contacting and electrically coupled to the second CNT catalyst plug, wherein the circuit layer is interposed between the first CNT catalyst layer and the second CNT catalyst layer. The in-process electrical circuit is free-floating within the chamber of the furnace and the furnace comprises at least one CNT precursor gas within the chamber of the furnace.

According to another aspect, there is provided a plurality of in-process electrical circuits within a chamber of a furnace, each in-process electrical circuit of the plurality of in-process electrical circuits comprising: a circuit layer comprising a first surface and a second surface opposite the first surface; a first carbon nanotube (CNT) catalyst layer comprising a first CNT catalyst plug on the first surface of the circuit layer, wherein the first CNT catalyst plug is electrically coupled to the circuit layer; a first CNT contacting and electrically coupled to the first CNT catalyst plug; a second CNT catalyst layer comprising a second CNT catalyst plug on the second surface of the circuit layer, wherein the second CNT catalyst plug is electrically coupled to the circuit layer; a second CNT contacting and electrically coupled to the second CNT catalyst plug, wherein the circuit layer is interposed between the first CNT catalyst layer and the second CNT catalyst layer; and at least one CNT precursor gas within the chamber of the furnace, wherein the plurality of in-process electrical circuits are free-floating within the chamber of the furnace.

Brief Description of the Drawings

The accompanying drawings, which are incorporated in, and constitute a part of this specification, illustrate examples of the present teachings and, together with the description, serve to explain the principles of the disclosure. In the figures: