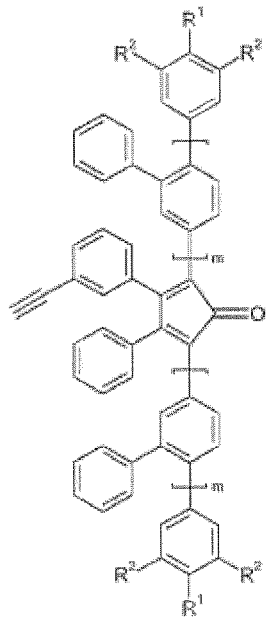
fromstoichiometry. No lateral solubilizing alkyl chains have been introduced into the graphene nanoribbons.

The second case suffers also from the stoichiometry issue due to the underlying A2B2-stoichiometry of the A2B2-type Suzuki protocol and the sterical hindrance of 1,4-diiodo- 2,3,5,6-tetraphenylbenzene.

The third case makes use of a step-wise synthesis which provides very defined cut-outs from graphene nanoribbons but is impracticable for the fabrication of high-molecular weight species.

It is an object of the ~~present invention~~embodiments disclosed herein to provide new methods for the production of graphene nanoribbons. It is a further object of the ~~present invention~~embodiments disclosed herein to provide suitable polymeric precursors for producing graphene nanoribbons, as well as methods and suitable oligophenylene monomers for preparing such polymeric precursors.

In an aspect, there is provided an oligophenylene monomer of general formula (I)



(I)

wherein

R^1 and R^2 are independently of each other H, halogene, -OH, $-NH_2$, -CN, $-NO_2$ or a linear or branched, saturated or unsaturated C_1-C_{40} hydrocarbon residue, which can be substituted 1- to 5-fold with halogene (F, Cl, Br, I), $-OR^3$, $-NR^3_2$, -CN and/or $-NO_2$, and wherein one or more CH_2-groups can be replaced by -O-, -S-, - NR^4-, -OC(O)- or -C(O)-, or an optionally substituted aryl, alkylaryl or alkoxyaryl residue;

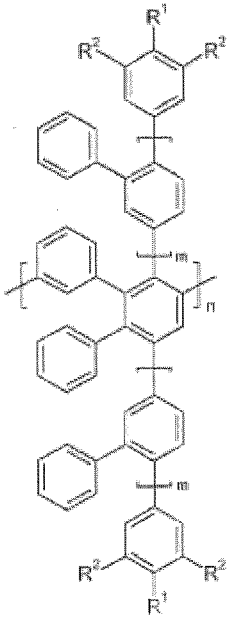
each R^3 is independently of each other H , C_1-C_{30} akyl, C_2-C_{30} alkenyl, C_2- C_{30} alkynyl, C_1-C_{30} haloalkyl, C_2-C_{30} haloalkenyl, C_2-C_{30} haloalkynyl or C_2- C_{30} acyl;

each R^4 is independently of each other H, C_1-C_{30} alkyl, C_2-C_{30} alkenyl, C_2- C_{30} alkynyl, C_1-C_{30} haloalkyl, C_2-C_{30} haloalkenyl, C_2-C_{30} haloalkynyl or C_2- C_{30} acyl; and

m represents 0, 1 or 2.

In another aspect, there is provided the use of the oligophenylene monomer as defined above for the preparation of a polymeric precursor for producing graphene nanoribbons.

In another aspect, there is provided a polymeric precursor for preparing graphene nanoribbons having repeating units of general formula (II)



(II)

wherein

R^1 and R^2 are independently of each other H, halogene, -OH, $-NH_2$, -CN, $-NO_2$ or a linear or branched, saturated or unsaturated C_1-C_{40} hydrocarbon residue, which can be substituted 1- to 5-fold with halogene (F, Cl, Br, I), $-OR^3$, $-NR^3_2$, -CN and/or $-NO_2$, and wherein one or more CH_2-groups can be replaced by -O-, -S-, - NR^4-, -OC(O)- or -C(O)-, or an optionally substituted aryl, alkylaryl or alkoxyaryl residue;

each R^3 is independently of each other H, C_1-C_{30} akyl, C_2-C_{30} alkenyl, C_2- C_{30} alkynyl, C_1-C_{30} haloalkyl, C_2-C_{30} haloalkenyl, C_2-C_{30} haloalkynyl or C_2- C_{30} acyl;

each R^4 is independently of each other H , C_1-C_{30} alkyl, C_2-C_{30} alkenyl, C_2- C_{30} alkynyl, C_1-C_{30} haloalkyl, C_2-C_{30} haloalkenyl, C_2-C_{30} haloalkynyl or C_2-C_{30} acyl;

m represents 0, 1 or 2; and

n represents a number of from 2 to 100.

In another aspect, there is provided a process for the production of graphene nanoribbons by cyclodehydrogenation of the polymeric precursor as defined above.

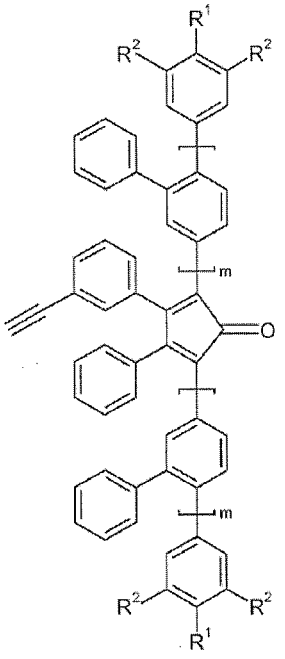
In another aspect, there is provided graphene nanoribbons, obtainable by the process as defined above.

In another aspect, there is provided a composition comprising one or more graphene nanoribbons as defined above dissolved or dispersed in a liquid medium.

In another aspect, there is provided an electronic, optical, or optoelectronic device comprising a thin film semiconductor comprising one or more graphene nanoribbons as defined above.

In another aspect, there is provided the use of one or more graphene nanoribbons as defined above in an electronic, optical, or optoelectronic device.

The problem is solved by a oligophenylene monomer of general formula (I),



(I)

wherein (I)

R^1 and R^2 are independently of each other H, halogene, -OH, $-NH_2$, -CN, $-NO_2$ or a linear or branched, saturated or unsaturated C_1-C_{40} hydrocarbon residue, which can be substituted 1- to 5-fold with halogene (F, Cl, Br, I), $-OR^3$, $-NR^3_2$, -CN and/or $-NO_2$, and