Figure S1: large SEM view of [TTF][TCNQ] nanowires and elongated platelets grown on stainless steel conversion coatings.
Figure S2: Infrared spectrum for Per$_2$[Au(mnt)$_2$] nanowire films.

Figure S3: Raman spectrum for Per$_2$[Au(mnt)$_2$] nanowire films.
In (EDT-TTFVO)$_2$FeCl$_4$, the donors stack along the $c$ direction and are connected to each other via through S···S contacts ($< 3.80$ Å) (Figure S4). Each column is also connected to adjacent columns with several short S···S contacts. The overall structure forms a homogeneous network of S···S interactions. In (EDT-TTFVO)$_4$(FeCl$_4$)$_2$, columns (along the $a$ axis) are built on trimers (A, B, C) poorly connected to another donor (D). These trimers are connected to adjacent trimers (A’, B’, C’), between others donors of neighbouring stacks (along the $b$ direction). The interplanar distances between the donor units range between 3.41 and 3.69 Å. The donor molecules overlap in a ring-over-ring fashion for B/C and A/B (forming then the trimer) and in a ring-over-bond fashion for A/D and D/C (resulting in one or two contacts between these units) (Figure S5).

Figure S4: Stacking arrangement of EDT-TTFVO donors in (EDT-TTFVO)$_2$FeCl$_4$ (left), and in (EDT-TTFVO)$_4$(FeCl$_4$)$_2$ (right) (donors are viewed along their long axis).
Figure S5: Overlapping modes of the EDT-TTFVO donor molecules in (EDT-TTFVO)$_4$(FeCl$_4$)$_2$.

Figure S6: Raman spectrum for Si-supported multilamellar membranes.