"Polyacrylic acid crosslinking with UV" refers to **a process where polyacrylic acid (PAA) polymer chains are linked together to form a network structure by exposing them to ultraviolet (UV) radiation**, essentially creating a gel-like material through a photochemical reaction, often used to modify the properties of PAA for applications like hydrogels, bio-sensors, and absorbent materials; this crosslinking can occur with or without the addition of a photoinitiator, depending on the specific application. [[1](https://pubs.rsc.org/en/content/articlelanding/2015/tb/c5tb00243e#:~:text=UV%20crosslinked%20poly(acrylic%20acid):%20a%20simple%20method%20to%20bio%2Dfunctionalize%20electrolyte%2Dgated%20OFET%20biosensors.), [2](https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819), [3](https://pubs.rsc.org/en/content/articlehtml/2015/tb/c5tb00243e), [4](https://pmc.ncbi.nlm.nih.gov/articles/PMC8945188/), [5](https://pubs.rsc.org/en/content/articlelanding/2010/sm/b923831j#:~:text=Typically%2C%20radiation%20or%20thermal%20crosslinking%20routines%20are,acid)%20(%20PAA%20)%20nanofibres%20and%20films)]

**Key points about UV crosslinking of polyacrylic acid: [**[**2**](https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819)**,** [**3**](https://pubs.rsc.org/en/content/articlehtml/2015/tb/c5tb00243e)**,** [**6**](https://www.researchgate.net/publication/274099469_UV_crosslinked_polyacrylic_acid_a_simple_way_to_bio-functionalize_electrolyte-gated_OFET_biosensors#:~:text=A%20thin%20layer%20of%20poly(acrylic%20acid)%20(pAA),exposure%20without%20the%20need%20of%20any%20photo%2Dinitiator.)**]**

* **Mechanism:** UV light interacts with the polymer chains, causing the formation of free radicals which then react with each other, creating crosslinks between the polymer chains, leading to a more rigid structure. [[2](https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819), [3](https://pubs.rsc.org/en/content/articlehtml/2015/tb/c5tb00243e), [6](https://www.researchgate.net/publication/274099469_UV_crosslinked_polyacrylic_acid_a_simple_way_to_bio-functionalize_electrolyte-gated_OFET_biosensors#:~:text=A%20thin%20layer%20of%20poly(acrylic%20acid)%20(pAA),exposure%20without%20the%20need%20of%20any%20photo%2Dinitiator.)]
* **Advantages:** [[2](https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819), [4](https://pmc.ncbi.nlm.nih.gov/articles/PMC8945188/), [7](https://www.sciencedirect.com/science/article/abs/pii/S0969806X19301380)]
  + **Precise control:** UV exposure allows for precise control over the crosslinking process by adjusting the irradiation time and intensity. [[2](https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819), [4](https://pmc.ncbi.nlm.nih.gov/articles/PMC8945188/), [7](https://www.sciencedirect.com/science/article/abs/pii/S0969806X19301380)]
  + **Mild conditions:** Compared to other crosslinking methods like heat, UV radiation can be applied at relatively low temperatures. [[1](https://pubs.rsc.org/en/content/articlelanding/2015/tb/c5tb00243e#:~:text=UV%20crosslinked%20poly(acrylic%20acid):%20a%20simple%20method%20to%20bio%2Dfunctionalize%20electrolyte%2Dgated%20OFET%20biosensors.), [2](https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819), [3](https://pubs.rsc.org/en/content/articlehtml/2015/tb/c5tb00243e)]
  + **Potential for surface modification:** UV crosslinking can be used to modify the surface properties of materials by creating a PAA layer with specific functionalities. [[1](https://pubs.rsc.org/en/content/articlelanding/2015/tb/c5tb00243e#:~:text=UV%20crosslinked%20poly(acrylic%20acid):%20a%20simple%20method%20to%20bio%2Dfunctionalize%20electrolyte%2Dgated%20OFET%20biosensors.), [3](https://pubs.rsc.org/en/content/articlehtml/2015/tb/c5tb00243e), [6](https://www.researchgate.net/publication/274099469_UV_crosslinked_polyacrylic_acid_a_simple_way_to_bio-functionalize_electrolyte-gated_OFET_biosensors#:~:text=A%20thin%20layer%20of%20poly(acrylic%20acid)%20(pAA),exposure%20without%20the%20need%20of%20any%20photo%2Dinitiator.)]
* **Applications:** [[2](https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819), [4](https://pmc.ncbi.nlm.nih.gov/articles/PMC8945188/), [7](https://www.sciencedirect.com/science/article/abs/pii/S0969806X19301380)]
  + **Hydrogels:** Creating hydrogels with adjustable swelling properties for drug delivery or tissue engineering. [[2](https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819), [4](https://pmc.ncbi.nlm.nih.gov/articles/PMC8945188/), [7](https://www.sciencedirect.com/science/article/abs/pii/S0969806X19301380)]
  + **Bio-sensors:** Modifying the surface of electrodes with a PAA layer for enhanced biomolecule detection. [[1](https://pubs.rsc.org/en/content/articlelanding/2015/tb/c5tb00243e#:~:text=UV%20crosslinked%20poly(acrylic%20acid):%20a%20simple%20method%20to%20bio%2Dfunctionalize%20electrolyte%2Dgated%20OFET%20biosensors.), [3](https://pubs.rsc.org/en/content/articlehtml/2015/tb/c5tb00243e), [6](https://www.researchgate.net/publication/274099469_UV_crosslinked_polyacrylic_acid_a_simple_way_to_bio-functionalize_electrolyte-gated_OFET_biosensors#:~:text=A%20thin%20layer%20of%20poly(acrylic%20acid)%20(pAA),exposure%20without%20the%20need%20of%20any%20photo%2Dinitiator.)]
  + **Superabsorbent materials:** Developing highly absorbent materials for applications like agriculture. [[2](https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819), [8](https://onlinelibrary.wiley.com/doi/full/10.1002/pat.5819)]

*Generative AI is experimental.*

[1] [https://pubs.rsc.org/en/content/articlelanding/2015/tb/c5tb00243e](https://pubs.rsc.org/en/content/articlelanding/2015/tb/c5tb00243e#:~:text=UV%20crosslinked%20poly(acrylic%20acid):%20a%20simple%20method%20to%20bio%2Dfunctionalize%20electrolyte%2Dgated%20OFET%20biosensors.)

[2] <https://onlinelibrary.wiley.com/doi/abs/10.1002/pat.5819>

[3] <https://pubs.rsc.org/en/content/articlehtml/2015/tb/c5tb00243e>

[4] <https://pmc.ncbi.nlm.nih.gov/articles/PMC8945188/>

[5] [https://pubs.rsc.org/en/content/articlelanding/2010/sm/b923831j](https://pubs.rsc.org/en/content/articlelanding/2010/sm/b923831j#:~:text=Typically%2C%20radiation%20or%20thermal%20crosslinking%20routines%20are,acid)%20(%20PAA%20)%20nanofibres%20and%20films)

[6] [https://www.researchgate.net/publication/274099469\_UV\_crosslinked\_polyacrylic\_acid\_a\_simple\_way\_to\_bio-functionalize\_electrolyte-gated\_OFET\_biosensors](https://www.researchgate.net/publication/274099469_UV_crosslinked_polyacrylic_acid_a_simple_way_to_bio-functionalize_electrolyte-gated_OFET_biosensors#:~:text=A%20thin%20layer%20of%20poly(acrylic%20acid)%20(pAA),exposure%20without%20the%20need%20of%20any%20photo%2Dinitiator.)

[7] <https://www.sciencedirect.com/science/article/abs/pii/S0969806X19301380>

[8] <https://onlinelibrary.wiley.com/doi/full/10.1002/pat.5819>